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ILLUSTRATIONS.

Part of the Kolowrat-Ring, Vienna 581

Derby School of Art (Plans, 587).—Messrs. Waller & Son, Architects 585

CONTENTS.

Strikes, Lock-outs, and Arbitration 571
The Restoration Question 572
Dutch Public Works 574
The Caxton Commemoration 574
Unity in Composition—Natural and Architectural 575
"The Renaissance in Italy" 576
The Durham Mining District 578
Measuring and Weighing the Great Pyramid 579
The State of the Fine Arts in Bavaria 579
Constantinople: an Art Thought about it 580
Proposed Great Irrigation Works for the Rhone Valley 581
Waste of Wood 581
Room Ventilation 582
The Kolowrat-ring, Vienna 582
An Institution for Manchester 582
Derby School of Art 583
One View of the Management of India 585
Building Disasters in America 586
Association of Municipal and Sanitary Engineers and Surveyors 590
Purchased by the Art-Union of London 591
Mycenæ 591
Society of Engineers 591
Bury St. Edmunds 592
Liability of Local Board to "Quantity Surveyor": Waghorn v. The Wimbledon Local Board 592
Masters and Men 592
The Proposed New Council Chamber, Guildhall 592
The New Buildings in Northumberland Avenue 592
Critical Restoration 592
The Factories and Workshops Bill 592
The Artisans, Labourers, and General Dwellings Company 593
Chancel Screens: Important Judgment 594
Byron Memorial Competition 594
Fall of a Bridge and Loss of Life 594
New Parks 594
Drying Process 594
Books received: Thomson's Street Life in London (Sampson Low) 594
Miscellanea 594

Strikes, Lock-outs, and Arbitration.

IT has not unfrequently happened, on those occasions of open outburst of hostility between masters and men which all lovers of their country deprecate, that we have felt bound to show that the latter have chosen to appeal to force rather than to reason. It is, therefore, the more readily that we call attention to the appeal to reason, rather than to force, which has been made by Mr. George Potter, in a letter published in the daily papers of the 30th of May, on the subject of the lock-out on the Clyde. We do not at present wish to intimate any opinion as to the side on which the right,—or the least wrong,—may lie on the present occasion. Opinions of a judicial character, when expressed by a public writer, should, in our judgment, be plainly and distinctly stated, with indication of the ground on which they are formed. They are not to be implied, or brought in under false pretences. It is as well to make this remark, because it is desirable to draw a broad line between what is worthy of the utmost respect and commendation in the arguments of Mr. Potter and the merits of the existing controversy. What is especially welcome is, to see an attempt, on the part of the majority, to appeal to reason rather than to force.

It does not, indeed, follow, that the majority are actually the stronger party. We think it is a matter of the utmost national importance that it should be fully recognised that this is the case. So much has been said and done of late to enforce the doctrine that the majority must be on the right, that the pernicious character of that fallacy cannot be too broadly exposed. In the first place as the majority will always,—or at all events in our time,—consist of the less informed, the less educated, and the least competent portion of the nation, there is certainly no ground for anticipating that its views will naturally be correct. It would be a false assumption to say that the minority would be more likely to be right than the majority, because the minority consisted of the better educated or the anyway better people. But it would be correct to say that the voice of the minority would be the nearest to truth if such was their character. In other words, counting noses has no relation to right and wrong. It is sound reason that settles that. There is, however, thus much in favour, under any circumstances, of the minority. Suppose both sides in a long dispute, or series of disputes, to consist of men equally qualified to come to a right conclusion as to right and wrong, and equally swayed by those human passions and weaknesses which are so apt to prevent the judgment from being impartial. In that case the majority, confident in their strength, will be apt to show impatience of argument, and to carry their measures by acclamation or by ready and common assent to the proposals of their leader. The minority, on the contrary, having no weapon left but that of reason, will be driven to make the best of that. Thus if we suppose a case, such as often occurs, in which there are faults on both sides, and in which it would be extremely difficult for an impartial judge to decide in which direction the balance really inclined, it is pretty clear that the side of the minority would be the most lucidly, patiently, and logically stated. At a distance of time or of space, therefore, the minority will always appear to be in the right, because they will have given more care to the statement of their case than their victors have cared to bestow on their own. And even if the majority had really the better claim to be adjudged in the right, the probability would be that the sense of power, added to the conviction in their own minds, would lead rather to overbearing by vote than to convincing by argument.

These remarks are extremely pertinent to the present case. Hitherto most of the conflicts between masters and men have been engaged, openly, on the ground of force. "You cannot do without us," says one party; "we will only come in on such and such terms, and there is the affair in a nutshell!" And it must be remembered that, on whichever side it has turned out that the real balance of power lay, the majority has invariably been on the side of the men. The very fact of their immense numbers has given them confidence. They have looked on the strong hands and brawny arms, which were the natural implements of labour, and which had only, it might seem, to strike the earth to bring forth plentiful fountains of wealth. They have been naturally impatient at the idea that any occult power,—call it capital, enterprise, education, intellect, knowledge of business, or what not,—is so essential to the production of that wealth that it has the right to enter into a partnership with labour on at least equal terms. This feeling is perfectly intelligible. It is one which a more intimate knowledge of the case entirely dissipates,—but it is only to be dissipated by such superior knowledge; and it is for this reason that those public writers whose aim is national welfare rather than party success, have always taken a tone which many of the working classes have failed to comprehend. Men who are intimately acquainted with the conduct of business, who are aware of the state of probable demand for certain products, who know the condition of the labour market, not only in the chief centres of production in the United Kingdom, but in France, Belgium, Germany, and the United States; who have visited the seats of former commercial prosperity, now reduced to silence or to beggary,—these men are aware of the great skill needed for the maintenance of a trade in any particular country or district, and are thus nervously anxious to discourage any of those disputes which endanger the permanence of such a trade. Who is right and who is wrong is a comparatively unimportant matter in the eyes of men who occupy a standpoint of some little elevation. It is the old story of the oyster and its shells,—while man and master in England are disputing for the upper or the under shell, the oyster is being eaten by a French or German rival, who will gladly lend his aid, and contribute his mite, to keep up the dispute.

On these grounds we regard the letter of Mr. Potter as a tacit admission that, on the present occasion, the Clyde masters are the stronger party. We do not say the party who are in the right. As to that, we reserve judgment. But when we find the advocate of the workman appeal—not to the argument of force, which has been usually that of his side of the question, but to that of morality, we cannot but infer that he doubts whether force is on his side. However that may be, we rejoice to see the mouthpiece of the working-men take this tone. We hope that it will be well responded to in a right spirit, and we hope, moreover, that when in the next swing of the pendulum labour shall again be sought for rather than have to seek employment, the spirit now manifested may be returned.

Mr. Potter speaks with truth and with feeling. "Hunger is, in truth," he says, "a horrible housemate." "The men may be beaten by the hunger of their wives and their children." "The miseries of war, without any of its questionable glories, will be suffered by them." "Twenty-five thousand workmen mean at least 70,000 souls, nearly the whole of whom are personally outside the quarrel." Mr. Potter's argument, in fact, is that of the wickedness and immorality of war. As to this, all good men are agreed. The question is, by what controlling force is war to be prevented? As to the civil war between employer and employed, Mr. Potter suggests the employment of arbitration. He has our most hearty and thorough concurrence in that wish to introduce this mode of settlement. We have little doubt that the large majority of the employers of labour throughout the country are of the same opinion. But what is necessary is, that arbitration should be not only resorted to now and then, as on the Clyde to-day, but should be made, if appealed to at all, universal, imperative, and armed with full power to carry out its awards in their integrity. As prophecy is proverbially unsafe, we will not say that it is only by some such method that the industrious primacy so long enjoyed by this country can be maintained; but we confess that we entertain a very strong opinion to that effect.

We think, however, that Mr. Potter stands in his own light, and opposes an unnecessary difficulty in the course which we should gladly see followed, by a little shortness of memory. "The men," he says, "never do make it any part of their policy to refuse to work for employers with whom

they have no quarrel for the purpose of defeating those who refuse to concede their demands." If this were the case, not only would the ground be cut away from under the feet of any employers who should propose a lock-out, as far as any question of right and justice is concerned, but it is not too much to say that the question of a lock-out could never arise. At all events, it is not the impression of either the employers as a body, the public, or those who, like ourselves, have watched with painful inquietude the labour struggles of the past quarter of a century, that the policy of the workmen has been such as Mr. Potter now intimates to be the case. "Such an imperial, high-handed policy as this, which perpetrates a general wrong for the attainment of a special end, is in the battle of labour purely an employers' policy,—too grand and too far-reaching in its sweep to be adopted by men who earn their bread by daily labour." On the contrary, it is the very idea that the policy of the unions, though anything but grand, in the sense of good for the country, is only too far-reaching in its sweep, that has worked that spirit of union among the masters which is a new feature in the case, and which seems likely to shorten, though it may embitter, the strife.

If the world at large has formed an erroneous view of the policy recommended to the working men by the counsellors of the trade unions, it is due to all parties that this misappebension should be at once dispelled. The view which has been taken by the masters we will state. It is, as will be seen, directly contrary to the above rather rhetorical sentence of Mr. Potter,—a sentence which at once prejudges any question to be submitted to arbitration by quietly affirming that all the injustice and immorality of past struggles lies at the door of the masters. The latter are under the impression that it has been the distinct aim and definite purpose of the unions to attack them in detail. Such, at all events, whether of set purpose or not, has been the course pursued. To some extent it has been a course indicated by the necessities of the case. It is obvious that as the subsistence of the workingmen is derived from wages, a universal strike, under existing circumstances, is impossible. Unless a solidarity be established amongst different trades, the general strike of any trade is impossible. For such a step would be no other than sawing off the branch of a tree on which the operator sat. There would be no power of resistance, no means of maintaining life for a struggle. But if, on the other hand, employers can be attacked in detail, the men who are on strike in one yard, or in one town, can be maintained by the contributions of their fellows at full work elsewhere. And as for special grounds of quarrel, they are always to be found when wanted. There can be no difficulty on that score. Thus then, it is the apprehension of the masters, they will be attacked and vanquished in detail, and by this policy, which is the only one on which any general movement can be organised, the supremacy of the unions will be finally established.

Against this policy,—which, if not openly avowed on the one part, has been both dreaded on the other, and indicated as practically adopted by the history of the contention,—the only defence on the part of the masters is counter-combination. This is a movement as much prescribed by the circumstances of the case as was the adoption of isolated attack. It involves, no doubt, the infliction of suffering on innocent people; but so does all war: and these are measures of war, though fought out, not by powder and shot, but by folded arms and frowning looks. The cruel and bitter nature of war no moralist can exaggerate. Of its absolute wickedness there can be little question. But it is not the use of a particular weapon, or the loss of life incurred by a particular operation, at which the moralist points with horror. It is at the entire system. So far as blame is apportioned, the heaviest part of it is laid on those who commence. The question is, "Who struck the first blow?" This should be remembered by Mr. Potter and his friends. He is now urging, against a lock-out, the same arguments which were urged against the last great strike in the Welsh collieries. We think that these arguments are most weighty. It will be a matter of national gain if their truth and force be fully appreciated by the great body of workmen. But they apply not to one move, but to the entire game. If we may take the fact that they are now urged as an intimation that those who began the struggle are now willing to treat for peace, it will be the best thing that has happened to the country for many years. We hold no brief for either party. We have no title or commission to speak for one We have no title or commission to speak for one more than for the other. But as patient and anxious watchers of the labour question for many years, grieving at acts on both sides, we can scarcely doubt that the employers of labour will be ready, in such case, to meet the men at least half-way. But there must be no mistake about the matter,—no blowing hot and cold. If the advisers of the unions are now ready to come forward and say, "We admit that the organisation of class against class, involving as it does great suffering to innocent parties, is not only an immorality but a mistake," they will find the offered hand very warmly grasped. But if they only have to say, "The organisation of the men against the masters is a weapon which we intend to retain: it is only the organisation of the masters against the men to which we object," the case is really one which cannot be put in plain English without showing its true character. If a lock-out is immoral, what is a strike? One is the counterpart of the other. Just as, in the variation of trade, at one time the demand for produce presses on the labour-market; hands are too few, and wages naturally rise: so at another time the slackening of demand throws unemployed labour on the market; hands are superfluous, and wages fall; so is it in all questions between man and master, unless those questions be closed by hearty and intelligent accord. If it be attempted, by artificial organisation, to interfere with the natural result on wages of the increase or decrease of business, the consequence can only, in our opinion, be disastrous. But, even if there be any doubt whether organised action, on either side, intended to affect the market value of labour be anything but a mistake, it is most certainly to be expected that organisation on one side will call forth counter organisation on the other. And each of these rival camps will—and, if they must fight, should — adopt its own most advantageous tactics. Attack, on the part of the workmen, is in detail. Even if such be not a decided plan, it is a necessary consequence of the position. In point of fact, it is always thus that strikes occur. Defence, or counter attack, on the part of the masters, is useless and idle in detail; it is only practicable as a combined movement. Can it for a moment be expected that the sole method of available defence should be abandoned? The lock-out is the reaction from the strike. Let the first be abandoned, and no one will hear of the second.

If Mr. Potter and his friends, therefore, are now so far on the same platform with ourselves as to say that they have found out, by long experience, that the attempt to organise labour against capital is a mischievous mistake; that it can be shown to be fallacious by the laws of political economy; and that it has, in actual practice, involved masters, men, and their common country in heavy and all but irremediable loss up to the present time, we have only to put our shoulders to the wheel together, and to block out the best measures to be adopted for substituting the peaceful method of arbitration for the wasteful and hateful warfare of strike and lock-out.

But if this is to be done, it must be done seriously,—well done,—done once for all. It cannot be done without the aid of the Legislature. It is not a hap-hazard recourse to good offices that will be of any use. Arbitration, if appealed to in earnest, must be an armed mediator, possessing power adequate to repress aggression on either side. Arbitration will forbid lock-outs; true: but she will also forbid strikes. If she has not power to do one, it is idle to talk of giving her power to do the other. The country,—the great third party which is so serious a sufferer by these civil wars of labour,—would gladly see arbitration instituted in the functions of a competent keeper of the peace. It is not impossible to indicate, at all events roughly, how this might be done. The Arbitration Act of 1867 gave licence for the erection of Courts of Arbitration, consisting of a chairman and from two to ten members for the settlement of disputes. From the operation of these courts, however, the main causes of dispute, rates of wages and hours of labour, were excluded. In 1872 a new Act was passed, somewhat amending the more obvious vices of the first; but still leaving the matter optional. Under the Continental code, in all cases of dispute between partners, arbitration is compulsory; and for it to be of any general avail such must be the case in this country.

Without professing to give a detailed scheme, or the draught of a Bill,—at least in the present instance,—it may be well to indicate the outline of such an arrangement as would lead, in our opinion, to an equitable result.

On any claim on the part of men for an advance of wages, as a general measure, or on any resolution on the part of masters, to reduce wages, a written notice, extending over a clear fortnight, terminating on a regular pay-day, should be given in writing by the party proposing the change to the other party.

A copy of this notice to be sent, within forty-eight hours, to the arbitration authority to be established by the new Act. Such notice to give the name of the arbitrator appointed by each party.

If, at the same time, notice be given that an umpire is agreed on by the two arbitrators, the arbitration authority to appoint a time and place for the investigation of the matter in dispute; adding, if it think fit, a legal assessor to the arbitration court. Otherwise, the authority to appoint the umpire.

The court, when constituted, to hear each party severally, in the absence of the other; and then to have the representatives of each party before it together, with the view of an amicable settlement. Failing this, the umpire to make his award in writing, which should have legal force, and only be subject to appeal, within a limited time, to a higher court.

Any attempt to force a change in the rate of wages, otherwise than by notice to the court of arbitration, to be heavily punished as a misdemeanour.

The details of such a measure would be matter for discussion. Thus there would be the question of giving security to abide by the results of the arbitration. This might be met by the expedient of continuing the rate of wages current at the date of notice until the delivery of the award, a portion,—say 10 per cent.,—of such wages being paid, not to the recipients, but into court, pending the decision. If the demand were for a rise in wages, security to be given by the respondent to the Court.

It is evident that the great objects to be secured by arbitration are two. First, to impress, not only on the minds, but on the hearts of our industrial population, that the rate of wages is not a question of caprice or of good pleasure, but of equity; and that the right rate at any given time is not a matter of opinion, but a figure at which experts can arrive without any dispute when all the facts of the case are before them.

Secondly, that this rate being thus a matter of business, it is to be settled as such, not by a recourse to the expedient of savage warfare, or to those combined movements of which the first result, whether man or master be the mover, is the paralysing of the arm of the labourer, and the drying up, for a longer or shorter period, of the very fountain of wealth. When once it is understood that there is such a thing as an ascertainably just rate of pay, a rate by which the supplier of handiwork can derive his proper share of the benefit of common enterprise, the only question which can remain for honest and intelligent men to discuss is, How shall we most readily ascertain what that rate is? When once that view of the case is taken, there will be an end put to armed injustice, whether it take the form of a strike or of a lock-out.

THE RESTORATION QUESTION.

"EXTREMES MEET" is an old and often illustrated proverb, of which we are reminded by the recent paper and discussion at the Institute, still uncompleted, on the subject of architectural restoration. As Sir Gilbert Scott observed in the course of the discussion, no one has abused people more than he has for not showing proper care of old churches and Mediæval monuments, and for restoring them in a careless, wanton, and destructive spirit. Now there comes an architect, the spokesman of a clique of architects and *dilettanti*, who from a completely opposite standpoint of architectural sympathies, finds fault with Sir G. Scott and others on the very same score. Both parties profess to be equally in earnest about the conservation of ancient buildings, though they differ diametrically as to the method of doing it, and as to what ought to be preserved.

The stand taken by Mr. Stevenson and his clique is on historical rather than on architectural ground; at least, that is the strongest ground which they have. The argument is that which has been used, less dogmatically and with

more reason, by the Dean of Westminster in regard to monuments of bad taste in the Abbey, which, however artistically and architecturally atrocious, are part of the history both of private families and of public taste. We are quite aware that the apostles of the new anti-restoration movement (who, after all, are but following the lead of some who went before), are prepared to urge their views on the ground of the intrinsic artistic beauty of the work of the post-Reformation period; but this side of the subject was not brought prominently forward in Mr. Stevenson's paper, perhaps because he felt instinctively that there was less chance of evoking sympathy on that ground. The line of argument taken mainly amounts to this,—that the history of the Church and the country since the Restoration, as illustrated in architecture, is just as interesting and important as its Mediæval history, and that one portion of the records of this is being completely obliterated. This is a strong way of putting the question, and there is much to be said for it, and which has been said for it by ourselves. It would, however, be open to some one holding a different view to reply that the ecclesiastical revival of the present day is as important an historical fact, and may claim equally to leave its material record in the buildings of the period. And if it be urged that this ought not to be done to the detriment or removal of records already existing, it might be replied (and this point has certainly been strangely overlooked in all that has been said and written on the subject) that such indifference to the records of the past, in comparison with the interest in what is wanted for the present, has almost always been evinced in cases of restoration, and is in itself a proof that the demand of the restoring party, however mistaken, is for the time being a genuine one. Mr. Stevenson and others seem quite to forget that the reverent care which they demand for whatever is in the building, because it is there, is a practice not sanctioned by any noteworthy precedent. The Mediæval architects had no right to claim immunity from restoration or removal for their own works, for they were perfectly indifferent to the work of their predecessors of the same epoch; the builders of the Early English period removed without the slightest compunction the work of the Normans, to be in time treated in the same way themselves by their successors of the next style; and the Perpendicular builders, more than all, were perfectly reckless as to the manner in which they spoiled and cut up a fine design of earlier date by the most clumsy and inartistic insertion of porches and windows in their own style, in the midst of work with which it did not in the least harmonise. When the Gothic style died and the Renaissance taste came in, the same "vandalism," as it is now called (or perhaps we should rather say, as it used to be called) was exercised by the workmen and architects of the new era, and niches, and reredoses, and windows were blocked up by quasi-Classic additions. Then, as we know, came the time, some thirty or forty years ago, when a great sighing over and condemnation of this same vandalism was set up: pious and enthusiastic hands tore away the reredoses designed in the chaste style of Inigo Jones and his contemporaries; and thrilling accounts went through the land, on the wings of the ecclesiological journals, of the resurrection of beautiful niches and other Mediæval remains, long entombed behind these excrescences in the taste of the detested Renaissance. Now the turn has come for the Gothic restorers, and they are charged with ruthlessly removing, or thrusting out of sight, work which gladdened the eyes of their ancestors a century since, and which is, at all events, equally entitled with Mediæval work to the respect derived from historical interest. To which, of course, the other side may reply, "Undoubtedly it is so entitled: then let it receive the same respect; which is, to be removed now that we no longer care for it."

We put this view of the case, without saying that it is entirely to be accepted, but because it seems to have been so completely overlooked. The persons who put up the post-Gothic additions and galleries in our cathedrals were utterly indifferent to preserving the historical character of the building; why then should it be such a crime to treat them as they treated others? to sacrifice the relics of a taste that is past to the demands of the present taste and of a new movement in ecclesiastical feeling? Some may think the ecclesiastical revival a mistake from other points of view as well as from that of architecture; but it is a fact in the history of English feeling, as real as any other; and that it should have found expression in its treatment of the edifices is a perfectly natural and logical corollary, and only what has happened, within certain limits, in every such case before.

In pointing out this view of the subject, we are not saying that there has not been a great deal of over-restoration carried on of late in England, or that the case of modern Mediæval restoration is precisely parallel to that of the intrusion of Renaissance work into the old cathedrals. That proceeding was *intrusion*, not restoration—not an attempt to bring back to pristine freshness and newness any old thing previously existing: the cases are only parallel in that they both involve a carelessness about pushing out and damaging what happens not to be in keeping with the taste of the moment. The more forcible argument against the restoration work of recent times would be that it has destroyed, in some cases certainly without sufficient reason, the reality of the old work, and substituted what is really a modern copy. In this respect we can hardly think that the replies to the paper at the Institute, so far as they have gone, were entirely satisfactory. Sir Gilbert Scott unquestionably made a "point" when he alluded to the advantage which Mr. Stevenson had over him in that he had never restored a church, and therefore presented no side for attack; but when, referring to one specimen of restoration which has been much questioned, he stated that the apse at the south aisle of Chester cathedral had been rebuilt mostly with its own materials, we must call the statement a somewhat courageous one. On the other hand, his reply as to the treatment of the tower of St. Alban's appears to us to be complete, and the attack of Mr. Stevenson upon it, and his quotation of the opinion of the monk who praised it in its original plastered state as "looking all like one stone," foolish and unreasoning. The plaster was falling off; it would have to be reinstated. We do not now believe that a plastered tower looking "all like one stone," is beautiful or architecturally truthful; therefore it was not worth while to re-cement it with new work which would have no historical value; better far to pull off the plaster which was coming off, and leave the brickwork, which is genuine, and will not come off. We are at a loss to know what other course could be recommended, and think Mr. Stevenson's attack on this head perfectly gratuitous and unjustifiable. Would he have left the Norman plaster hanging in patches, to come off little by little? There is no other course; and Sir G. Scott was really quite justified, in view of such a case as this, in taunting Mr. Stevenson with being merely destructive in his criticism, telling us all we should *not* do, but nothing that we should.

The fact is, that in the attack which has been made, not without reason in some ways, upon the restoration movement, mere sentiment plays too large a part, and certain aspects of the subject, both from an artistic and a practical point of view, have been totally overlooked. Taking the æsthetic side of the subject, it is idle to pretend that the post-Reformation work,—chiefly woodwork and decoration,—which it is asserted is removed and treated disrespectfully by Mediæval restorers, is of the same artistic value as the Gothic work which it in many cases conceals and disfigures. In the first place, unless all that we know and believe about the principles of artistic and decorative design, and of the treatment of material in design, is a delusion, the style of a large quantity of the work in question is, abstractedly considered, irredeemably bad; even the work of Gibbons, remarkable as it is in its own way, is admirable for delicacy and brilliancy of execution, for achieving impossibilities in wood-carving, rather than for anything in the taste or ideas embodied, which are too often exceedingly vulgar. And even were this not so, it cannot be pretended, with any show of reason, or of just criticism, that the work of a period which is itself a revival, like the Renaissance, and which, as practised in this country, was a very corrupt revival, is to be compared in interest with the remains of a great original style in architecture and ornament, which was of spontaneous development, and depended for its essential elements of greatness upon no repetition of what had gone before. The Gothic revival is a revival, or an attempt at one, of what was itself original; the movement which has got the name of "Queen Anne," is the revival of a revival, the original of which is itself a corruption of Greek elements of art through three or four stages of decadence and debasement. To put the two things on the same footing is out of the question. Bearing this fact in mind, it is to be remembered also that there is the question of the architectural and artistic unity of a great structure to be considered. It is perfectly true that the Mediæval architects did not consider this, but patched on to a cathedral, each in the style of his own day; true also that the historical interest of the buildings is increased by this patchwork. But that does not alter the fact that there is such a thing as coherence and unity of architectural style and effect, which is an end desirable in itself; and when any piece of historical patchwork is so decayed as to necessitate its removal, there is much to be said in favour of restoring, not an imitation of what has been removed, the only value of which is gone the moment the thing itself is gone, but what will harmonise with and complete the main design, regarded now as a work of art, not of archæology. Mr. Stevenson's comments as to the improvement effected artistically by the introduction of Perpendicular tracery into the windows of a Norman cathedral we look upon really as audacious nonsense, the expression of a taste utterly blind to the conditions of architectural fitness and unity of expression. To say that Perpendicular tracery thus inserted is historically interesting, and ought not to be removed as long as it is in proper repair, is one thing, and is an opinion in which we should be entirely disposed to concur; to say that in an abstract point of view it improves the architectural effect of a structure with which it has not the slightest affinity of style or feeling or constructive motive, is simply to exhibit deplorable critical incapacity. Architectural effect is one thing, archæological and historical interest is another: the latter should have pre-eminence as long as the existing remains can be preserved; when this cannot be done, the archæological consideration is set aside, and that of architectural completeness takes its place.*

But there is another view of the question of restoration, the practical one, which seems to be utterly left out of sight by the attacking party. Whatever the private opinion of any of us may be as to the ecclesiastical revival, it is, as we have pointed out, a fact which must be recognised. There are an immense number of persons, and will be probably for a good while to come, who look at things from an ecclesiastical point of view, and to whom churches to worship in are what must be called a practical necessity. Why, this being the case, they are not to be allowed to keep their buildings in repair, and even to re-adorn them, it is difficult to say, provided it be done rationally, and in good taste. With Mr. Stevenson's remarks upon some of the treatment of Mediæval churches by restorers, such as the thick black-jointing in Heckington Church (the effect of which is detestable, and has been before specifically condemned by us), we quite concur. But why there should be a tirade against re-decorating and beautifying a church or a cathedral the interior of which has grown old and dingy, when it is really in practical use for daily or weekly service, it seems impossible to show upon any ground of common sense. It would be as reasonable to find fault with the Duke of Northumberland, for instance, for decorating and refitting Alnwick Castle. Members of what we will call the anti-restoration clique have set up the complaint, in the columns of certain journals, against the new look of the restored interiors, with varnished woodwork and shining tiles. The Rev. W. J. Loftie, in a paper in the current number of *Macmillan* on "Thorough Restoration" (a paper, we admit, marked by much more general sense and better literary style than some previous efforts by the same writer would have led us to expect from him), laments over the loss of the old-fashioned parish church, with its high pews and other venerable absurdities. We sympathise entirely in the feeling of regret over the loss of what is inextricably bound up with early association; still, we may reasonably ask Mr. Loftie and his friends, if they took a lease of an old mansion,—such a place as Haddon, for example,—to live in, not to look at, would they not furnish it comfortably according to their tastes? And why is a church, which is in practical use, not to be fitly refurnished? All this these gentlemen seem totally to forget in their jeremiads. And even the question of practical

* We assume, and are disposed to abide by the position, that no old work of an original style, and marking points in the history of the structure, should be interfered with: still, we are by no means sure that where inferior and later work really spoils, architecturally, a grand building with which it is not in keeping, its removal is not justifiable on architectural grounds. There is at least much to be said for this view of the case.

safety seems to be ignored. We can fancy the sentimental anti-restorer gazing upward in a fine rapture at the front of some beloved edifice, his thoughts running somewhat in the strain of Congreve's too celebrated musing on the reverend face of "This tall pile," and accosted by the practical parishioner:—

"But, sir, the 'tall pile' is in a dangerous state. The foundations were not properly looked after by the Mediæval builders, and the stone was not judiciously selected, and unless we renew and reface and underpin there seems some question of its stability. The foundations want draining, too——"

Anti-Restorer.—"Oh, sir, disturb not the venerable structure. The centuries have set their mark upon its stones; do not wantonly and irreverently obliterate the touches of time."

Parishioner.—"By no means; not wantonly or irreverently, I hope. But, sir, I and my family sit in the church every Sunday; and from the way the walls have spread, and the general aspect of the whole, we fear the vault will fall on our heads some day."

Anti-Restorer (with tears in his eyes).—"Ah, sir, let it fall! Touch not its mouldering stones! Let it crumble piece by piece! True, it may come down on your head in the middle of the Litany some day, and possibly you may be killed; but that is only a possibility. You will have shown your reverence for the ancient structure!"

Parishioner.—"I may be very stupid; but that seems to me rather an upside-down way of reverencing the structure. I am very fond of an architectural ruin; but I *must* have a church to worship in."

The parishioner possibly would not be very well up in architectural polemics (the luckier for him!), otherwise he might proceed to say, what we add for him, that this passage of arms on the subject of restoration savours a great deal more of sentiment and party-spirit mingled, than of common sense and genuine interest in the buildings in question. It is absurd for those who have started this campaign to suppose that people do no see through the tactics employed. We all know well enough why certain gentlemen's names always appear together in connexion with the subject,—why a certain leading architect is always libelled in the columns of the *Athenæum*, and so on. And, to say truth, the respectability which would attach to the movement, if we could believe it to be more genuine in character, rather disappears when we perceive pretty plainly that it is only the war-cry of a new sect of architects and amateurs, who wish to make their voices heard in some way or other.

The lesson to be learned from both sides alike is to get clear of sentimentalism about architecture, ancient and modern. When the Mediæval revival was set up there was doubtless a dire amount of sentimental nonsense talked about it by persons who took for their motto "*donec templa refeceris*." Now they have had their turn, and another set of sentimental gentlemen have got up another sort of watch-word, and wish to insist that we shall recognise their sentiment as the only proper and genuine one. Concerning all which our comment would be, that sentiment in architecture has led, and almost necessarily must lead, to doings which, though they may be applauded by one generation, look ridiculous to the next; and that what both sides want is a larger indulgence in the quality which architecture, of all the arts, most specially stands in need of, but of which it gets in these days so very little,—common sense. And the teaching of common sense in this matter is, as we have long endeavoured to show,—Touch all old buildings and monuments with reverence, but prevent the necessity for wholesale renovation hereafter by careful maintenance and repairs in time.

Right to Foreshore at Portsmouth.—The Corporation of Portsmouth have established their right to the foreshore of the harbour in an action brought against them by the Crown, to which *primâ facie* belongs all the ground between high and low water mark. The Corporation produced charters, one of which dates from the year 1230, to show that the Crown had transferred its rights to the borough, and they gave acts of ownership by the Corporation, including the lease of some portions of the land in question to the Crown, who had paid rent to them. The Exchequer Division held that the title of the Corporation displaced the *primâ facie* title of the Crown.

DUTCH PUBLIC WORKS.

PERHAPS no part of the earth's surface has been changed so much by man's hand in the course of the last decades as the Dutch province of North Holland. Any one using the railway from Haarlem to Amsterdam thirty years ago observed on both sides a boundless waste of water,—on the one side the Y, on the other the Sea of Haarlem, the crumbling activity of which seemed to threaten even the safety of Amsterdam, Haarlem, Leyden, and Utrecht. At the present day, on the contrary, he overlooks in both directions a wide expanse of garden and pasture land, for the draining off of the Sea of Haarlem was completed as early as 1853, and that of the Y will be concluded in a few years' time. All these works bear a certain relation to each other; they form the parts of one grand scheme, the purpose of which is to obliterate the encroachments made by the sea in the province of North Holland in the thirteenth and fifteenth centuries, and to restore to Amsterdam its former importance as a commercial emporium. The construction of the Canal of Holland "op zijn smalst," commenced in 1862; the completion of the line of railway leading from Amsterdam across the Y over Zaandam to North Holland; the establishment of a shorter communication between Amsterdam and the Rhine by making the projected canal through the Gelder'sche Vallei; as well as the laying dry, to be completed in ten years, of the southern part of the Zuyder Sea,—will complete the present works, and, in Dutch opinion, be sufficient to restore to Amsterdam to the fullest degree its former importance. In former years, when the draught of ships was less, and the engineer's skill had not yet so completely mastered the difficulties attendant upon the construction of harbours close to the sea as at the present day, it was the custom to place commercial towns as far inland as possible, which was all the easier as the effects of the tide, though in a gradually decreasing degree, are felt for miles up the estuaries of rivers. At that time the larger Zuyder Sea served very well as the entrance to the harbour of Amsterdam. When this inland sea, of little depth, dangerous on account of its storms and shallows, no longer answered the raised requirements of the draught of ships, the North Holland Canal was proceeded with, which, crossing the whole of North Holland, reaches the North Sea at a distance of nearly forty-nine miles, to run which took at least eighteen hours, the low depth at the entrance often besides necessitating an unshipping of part of the cargo. In consequence of those disadvantages, with the laying dry of the Y, the construction of the Canal of Holland op zijn smalst was proceeded with. The latter reaches the sea at a distance of about sixteen miles, involving a run of four hours, its depth permitting an unimpeded passage to even the largest sea-going ships.

Any one travelling at the present day on one of the numerous small steamers running between Amsterdam and Zaandam observes as the remnant of the former Y only a canal of double the breadth of the Rhine at Cologne. The remainder has been parted off by dykes constructed of fascines and stone, but the operation of pumping dry the ground gained and the process of transforming it into pasture land have not yet been quite completed. West of Amsterdam, the swivel railway bridge, not yet finished, of the line of railway from Amsterdam to Zaandam crosses the canal, and still further westward the line from Haarlem to Alkmar. The canal, which naturally is less wide in those places where there was no natural channel, and an artificial one had to be excavated, is completed along its entire length, but not the two large dykes which form a kind of harbour at its mouth at Uitmoden, and which are to facilitate the entering of ships. The construction of those dykes meets with extraordinary difficulties, not so great, however, as will be encountered in the intended harbour works at Scheveningen. At the same time that the damming in of the Y was proceeding, a further tract of land, at Amsterdam itself, extending for 547 yards from the dam formerly washed by the sea, has been wrested from it, and at this outermost strip of land, called the Buitenkant, the great central railway station of the city will soon be reared.

The intended construction of the new Rhine Canal may be passed over, particulars respecting it having already appeared in this journal;* but a few additional figures respecting the Zuyder Sea may not be without value, the States-General having passed the Bill for its drainage. The laying dry of the 18,000 hectares (44,480 acres) of the Sea of Haarlem, the bottom of which was in some places as low as 16 ft. 6 in. under the lowest water-level of Amsterdam, was completed in thirteen years, after an expenditure of nearly 1,175,000*l.* The sale of the land gained producing only 775,000*l.*, the works resulted in a loss to the exchequer of 400,000*l.* But in the case of the Zuyder Sea, such an unfavourable result is not expected, the value of the land gained being estimated at 80*l.*, the cost of reclaiming it at only 48*l.* per hectare (or 37*l.* 16*s.* and 19*l.* 8*s.* per acre respectively). If it were intended to drain off the whole Zuyder Sea, a dyke of a length of from nine miles to ten miles, from Enkhuizen to Stavoren, in Friesland, would have to be drawn, besides providing an exit for the Yssel, which, during the winter months, discharges a volume of from 35,000 to 140,000 cubic feet of water per second into the basin of the Zuyder Sea. The present plans of laying it dry, consequently, include only its southern part. In four places, at Enkhuizen, Kampen, and at both sides of the Island of Urk, a dam of a length of 25½ miles is to be taken in hand, the height of which, above the lowest water-level at Amsterdam, is to be 16 ft. 6 in.; above the highest level, however, 8 ft. 3 in.

It may be left undecided whether Amsterdam will succeed by all those works of retrieving its former importance, as compared with Antwerp and flourishing Rotterdam. The two latter cities are undoubtedly somewhat nearer to Central Europe, because they possess a better river communication with it, and Amsterdam would perhaps never have risen to its former importance for commercial reasons alone if the wars of the sixteenth century had not destroyed Antwerp's prosperity, and had not placed Amsterdam, which escaped, politically in a most favourable position.

* See *Builder*, Jan. 20, 1877; also Dec. 11, 1875, as to draining of Zuyder Sea.

THE CAXTON COMMEMORATION.

THE loan collection of books from the press of Caxton and other early printers, together with specimens of modern printing and printing machinery, to commemorate the introduction of the art of printing in this country, will be opened next Friday, in the western galleries of the Exhibition buildings at South Kensington. The celebration was inaugurated by a special service, at which Dean Stanley preached, held last Saturday in the Abbey under the shadow of whose precincts William Caxton set up the first English printing-press. It may perhaps not be amiss, in noticing the opening of the exhibition, to place before our readers a translation of the ode published as a memorial-plate (but rarely seen in this country) issued at the fourth centenary jubilee of the art of printing, celebrated thirty-seven years ago all over Germany. The ode commemorative of the Caxton celebration remains to be written.

MEMORIAL PLATE

FOR THE FOURTH CENTENARY JUBILEE OF THE ART OF PRINTING, 1840.

Sublimest art! by type's oft varied stages,
To lend an echo to the lucid word,
So that forthwith from thousand magic pages
The South and North resound with one accord:
A ray of bliss, succeeding gloom of ages,
It flashes through the nations bright record,
To keenly point in ever clearer light
The path of truth, of virtue, and of right.

The force of protean type with apt precision
Sets nimbly free the soaring flight of thought;
It utters loud the people's free decision,
In open combat bringing fraud to naught:
Humanity, thrill'd deeply by the vision
Of this first book, does homage free, unsought;
"Hail to th' invention!" shout the peaceful legions
In latest times, to the remotest regions. O. S.

"Road-Stuff" v. Thames Sand.—At a late meeting of the Holborn Board of Guardians, Mr. Cornwell said that when at the schools recently, he went on the scaffold and found that the bricklayers were bedding the bricks of the new building with "road-stuff," in place of Thames sand, and on asking why this was done, he was told that they were afraid of frost, but that the joints would be filled in with Thames sand. It was unfair to the other contractors to use road-stuff, as it was a saving of about 7*s.* a yard. He trusted that the matter would be gone into. It was resolved that a letter be written to the architect (Mr. Saxon Snell) on the subject.

UNITY IN COMPOSITION—NATURAL AND ARCHITECTURAL.

WE observed in a recent paper,* which may not yet have passed out of the recollection of all, that the highest expression of unity is gained for an artistic composition when all the diversities which it includes are so grouped, at last, that a pair of similars and no more declare themselves as constituting together the single whole. The application which was then given to a principle so enunciated regarded only the case of bilateral symmetry, such as is exemplified in the façade of York Cathedral or of the Pantheon,—in the human face or form, or, indeed, in almost any leaf or flower from any shrub or tree. But the principle here involved may be developed to another and broader application, with new opportunities of variety, and it becomes in this new phase especially contributory to richness of design from the very circumstance that it does not conflict, but is susceptible of combination, with the former. The examples already adduced, when taken strictly, imply the repetition of similars, not only in kind but in quantity,—that is, in bulk and dimensions also; and in such case the tameness of mere repetition of like forms extended in a row is left to be countervailed alone by diversity of position,—by the balance of reversed and contrasted presentation. This is the single fundamental difference in the entire assemblage, which is harmonised and reconciled by the binding tie of equality. But when differences among the elements of a composition are more declared in character, the question of equality in respect of dimensions among parts that must of necessity be combined, but make no pretence to similarity in form, is set aside perforce. A spire with its supporting tower may be a whole of which the unity declares itself by exact symmetry about a central vertical plane with the happiest effect, but we shall be disappointed if we think to compass or improve an effective result as unerringly and as matter of course, by making the tower and spire of equal heights.

For the relation of equality we must substitute what, indeed, is but an extension of the leading principle, the relation of simple proportionateness; we have to recognise that the single relation, let us say, of one to two as between heights of tower and surmounting spire,—the spire being double the height of the tower, or *vice versâ*,—supplies a principle of regulated combination, that is, of unity, quite as absolutely as was conveyed by the relation of one to one, or exact equality, in a comparison of the lateral halves. In what manner variable proportions may be applied to lateral as well as vertical distributions, as to the relative magnitude of flanking and central portals,—or the gradations of the leaflets of a roseleaf,—is matter for independent exposition; at present it concerns us to notice how the recognition of the extended principle opens most liberal opportunities for very varied schemes of combination, accordingly as one proportion or another is adopted out of a crowd at command. Not, however, that the crowd may be dealt with indiscriminately, and that there are not certain classes or ratios which have prerogative advantages for specific applications. We shall find ourselves led up to the recognition of some of these before we have gone very far with the illustration of one or two leading examples. One caution only it is as well to premise,—that the effectiveness which may be ascribed to certain numbers or ratios is only to be claimed or allowed in virtue of demonstrable effectiveness, and not from merely mystical or cabalistical presumptions. The traditions or the practice of the ancients and the Mediævals may be of use in prompting a line of investigation, and even, in fortunate cases, of putting us on the right track; but authority alone is not to be accepted in favour of so-called sacred numbers or proportions; their importance must rest upon, and is bound to be verified and accounted for by, experienced effect and rationality.

Provided we adhere scrupulously and watchfully to due generality, we shall find that the same analogy holds good between the human form and architectural compositions in respect of due proportion as contributing to efficiency and beauty, that has already been set forth as obtaining between their organic proprieties. But the subject seems to grow upon the imagination as we attempt to grasp its general outline, and it may perhaps be approached most satisfactorily if, dealing in the first instance with human proportions, we bespeak free confidence meanwhile that all deductions will finally be brought home to an architectural application. An appeal for confidence in this matter is in itself no moderate display of the quality which is relied upon; some considerable experience of what reception our present subject usually meets with in verbal exposition warns us of as much. The very mention of the word Proportion, still more of Theory of Proportion, has been observed too frequently to produce an expression of alarm which preludes the moving of some previous question,—the resort to some stratagem, however crude, "how not to" entertain the question in any form at all. When the admissions have been challenged with such a design, and it has been candidly conceded, that objects which are equally beautiful do not agree in their proportions, and that theory, when best understood and most fully set forth, still gives no help to working out a set of proportions, which, by simple process of deduction, evolve a beautiful result as if mechanically, —if, in fact, the calculating engine requires any further exertion beyond turning a handle so many times, and then reading off results, the entire subject is declared to be smitten with judicial sterility, and ears are stopped, or attention resolutely withheld from any further exposition or protest. It is the happiness of the written word, however, to appeal with coolness to a cooler and larger circle of students, and to reach inevitably many minds of more confirmed logical fibre, to say nothing of being gifted with that quality of candour which only lives in conjunction with the courage to incur responsibility for an opinion after a full hearing.

Those who object that objects equally beautiful have different proportions, may be left aside with the parting recommendation to consider that their own thesis implies that variations in beauty are affected by variety of proportion,—the very mystery which it is proposed to investigate; those who denounce as barren the theory which does not pretend to supply an automatic rule for the production of the beautiful, may be invited to reopen the discussion when they have succeeded in persuading musicians that it is idle to give labour to studying a theory of harmony, which, after all, will confessedly not enable them to work out by system a single beautiful air. As to those who object that proportions, of which we cannot recognise the numerical expression, must be without influence on our sensibilities,—"Waste we not words on these,—just glance and pass."

It is worth while, before dealing with the results of inquiry, to state succinctly the process by which results of any value may be hoped for. It is to the unbiassed sense of beauty that we have to trust, in the first instance, for the identification of the subjects which merit analysis, — the beauty of nature especially, which declares itself to all, and, in the case of art, the beauty of whatever monuments have been crowned by the applause of the most refined judgments of successive generations. Beauty so manifest ever makes manifest no less that it is largely dependent on the relation of its parts to each other, in respect of bulk and linear dimensions,—that is, on proportion; the fact is certified by a "method of differences,"—by the constant experience how variations, of more or less on either side of some standard, not the less certainly existent because occult, transform beauty into ugliness; that beauty is also dependent on the combination of various proportions, and proportions realised, moreover, with very considerable exactness, is an inevitable conclusion from the same experiences. Scientific confirmation of a character superior to cavil is supplied in the instance of music, where the strictest of all tests may be applied, and are as strictly responded to.

The selection for analysis of an object of beauty unimpeached is, therefore, first required; measured or estimated quantities have then to be obtained, as accurately and exhaustively as the case admits, and ingenuity exercised in the institution of varied comparisons to discover which terms are required to be mutually dependent, as well as the relative proportions by which such dependence is effectuated. A prime reward of successful analysis will be the recognition of the rational principle on which certain terms are required to be brought into relation,—why it is that accurate proportion is of value as between certain two elements or divisions rather than between certain other two. With such a recognition a clue is gained which shortens up inquiry by directing at once to cardinal and critical comparisons. Architecture, fortunately, is rich in examples of beauty that are worthy of all study. For the furtherance of such study, the survey of the Parthenon by Mr. Penrose is particularly valuable, from its completeness, exactness, and then in virtue of the universally-admitted and ever-unimpeachable beauty of the example. Architecture naturally admits of precision, and we possess, most happily, a store of materials in measured surveys of other buildings, both Greek and Gothic, which illustrate and confirm a variety of important conclusions and principles. There is more difficulty to be encountered when we enter on the theory of the proportions of the human figure; it is not easy to obtain direct help from the living model; too seriously and too sadly is this brought home to the draughtsman from the life. A student more solicitous than Fuseli for truthful effect has reason enough to echo his complaint "that nature put him out." A perfectly beautiful, an unerringly characteristic, human form, is rare indeed—if, indeed, it ever exists; and vain were an endeavour to compound for truth by an average of conflicting errors. To one admirable, however qualified, example, when fortunately lighted on, must be assigned more value than to any multitude of variations; and if, after all, it only ministers a proximate coincidence, we may felicitate ourselves on our good fortune, though it does not extend beyond obtaining a hint or a confirmation of a clue.

The suggestion is obvious to resort to the finest of the statues which we have inherited from antiquity. Doubtless we have characteristic beauty embodied here most magnificently and gracefully; but the difficulties are all but insuperable of deriving from them a series of measurements which will be available for scientific comparisons. Symmetries are disarranged or disguised by attitude, and even by certain licences which were indulged in, if not imposed, for the sake of, and by the necessity of, sculptural effect. So it is that the reports of the most skilful of the scheme of proportion employed in the same statue, vary most perplexingly.

It will, therefore, be understood that the conclusions which we have rested in and must refer to in regard to human proportions are by no means verifiable by particular examples, and cannot be so in the nature of things; though they have been adopted, nevertheless, after more comparisons, for the sake of arriving at a theoretical norm, than the reader need be troubled with.

Two relations of equality in the distribution of the frame may be mentioned, though they concern us here but little, and they may be left for others to discuss. It may be asked what coincidence is there between any well-marked line of structural difference, and the line which equally divides the weight of a well formed and developed frame between the upper and lower portions? Then, again, another line of equal division may be taken, in this case vertically, upon the side view of the figure as erect. How far, it may be asked, will there be a coincidence of such a plumb-line with leading points of bearing and support, as the socket of the hip-joint, the heel, &c.? The normal curvature of the spinal column will probably be found to accommodate the exigencies of balance on either side of such a line.

The main value of proportionate adjustment is the conciliation, for a definite purpose, of elements which are naturally contrasted, but not incompatible. The problem of harmony, in other words, is to discover the elements which, for all their difference, are susceptible of combined efficiency, and then to educe the relative quantities on which this efficiency depends, even as the length and strength of the string to the bow, and of the arrow to both. But let the architecture of the Greeks supply a leading illustration. The façade of a Doric temple is divisible by one grand principle of contrast between vertical and horizontal members; that is, between the erect columns on the one hand, and on the other the steps or basement below, and the epistylia above, the entablature and pediment together. The horizontal members are thus occurrent in two groups; but by masterly insight into the arcana of harmonious combination, the Greek,—some individual Greek genius first,—struck the comparison between both conjoined as against the column which stood singly in the same relation to both, and thus decided the expression of unity by bringing all under a single proportionate relation.

In the Parthenon the proportion of the height of the column to the joint height of these hori-

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* See p. 523, *ante*.

zontals is precisely as 10 to 9;—10 : 9 : : 34·253 : 30·87 (measured 30·932).

When we turn to the erect human frame, the leading contrast that we recognise is between the united and massive trunk on the one part, and the head and neck and limbs on the other. The arms do not enter into the comparison when we deal with the figure as erect, and the terms of our comparison in respect of proportion, therefore, are the height of the trunk alone, against the joint height of neck, head, and legs, between a single and a combined or composite term; precisely, we may say, as in the architectural examples.

The decision which we take on our own responsibility is, that the normal height of the trunk is one-third of the full stature; or, in other words, the height of the trunk to the joint height of legs and head is as 1 to 2. This proportion, it will be observed, agrees with that of the architecture in one important element of simplicity,—the difference between the terms being unity,—a single aliquot.

The propriety of the adoption of these particular terms for proportionate combination may be assumed perhaps to justify itself. That the exactness with which the proportion was executed was regarded as of importance may be established by comparison with other examples.

The comparatively small difference of the terms (one tenth) was dictated in the Parthenon by the dignity of its close order of columniation. In smaller temples, the difference, while still thrown on the same side, is considerably extended. In the Temple of Theseus the proportion is as 5 to 4,—the same as 10 to 8 as against 10 to 9 in the Parthenon,—the increased difference of an eighteenth of the total height instead of a nineteenth.

Intermediate proportions are,—Bassæ, 6 to 7, and Sunium, 7 to 8; in each case the terms still differing by unity.

We may thus construct the following series of ratios, any one of which might be available, as, in fact, almost all may be found adopted in Greek practice:—Commencing with the heavy Parthenon ratio, we have the sequence in the order of gradually increasing lightness of the column,—10 : 9, 9 : 8, 8 : 7, 7 : 6, 6 : 5, 5 : 4, 4 : 3, 3 : 2, 2 : 1. The principle finds its limit in the ratio 2 : 1, the adoption of which would give a column just double the height of the joint associated horizontals,—the steps, entablature, and pediment, or two-thirds of the total height of the front elevation. This proportion is adopted in some light Ionic façades; even so the desire to attain still greater lightness, yet without absolutely renouncing the cherished principle, induced some Greek architects to strain a point rather illicitly,—to throw the base and capital of the Ionic columns, as flat or horizontal members, into the general horizontal term, and make the shaft alone the double of this augmented measurement.

It will be observed that in all these instances the superior term of the ratio is given to the column; that is to say, the column always exceeds the half height of the façade by some exact and simple aliquot of the full height, &c.; the relative difference is least in the case of the close composition of the Parthenon, but even here tells quite effectively. How early this principle was arrived at it is impossible to say; among the cited examples, the Temple of Theseus was probably the earliest in date, but does not carry us back far. It is to be hoped that the excavators of the great hexastyle temple of Jupiter at Olympia will recover and record the details so completely as to enable us to determine whether it dated after the recognition of this rule, or not rather before it, as some considerations induce us to anticipate. When the Æginetan temple was built the principle was unknown or disregarded, and a primary disproportion was thus introduced which goes far to vitiate even the essential dignity of Doric ordination by the suggestion of clumsiness. It is probable that in this instance, as in so many others, the full perfection of the genius of Hellenism was reserved for Athens. The Sicilian temples without exception suffer under the same original defect as the Æginetan; in both there is a jar upon the sense in passing from the front elevation to the flank, where the vertical element is relatively so predominant.

The general effect of favouring the height of the vertical member in a Greek façade is of course to give an advantage to the void as against the solid. We discern the same tendency in the progressive changes of proportion in Gothic architecture. It is observed by Fergusson that the scheme of division of the side of a Gothic nave was originally into equal thirds; an example is furnished,—one of many available,—by the design of Winchester Cathedral before its transformation. The distribution of the three divisions was studiously varied, but still the monotony of a sequence of three equalities was invincible in the absence of any unequivocal predominance of a single member. William of Wykeham, following many a precedent, cut through the triforium and lifted the pier arch to a liberal half of the height of the bay, instead of a stinted third, and gave to his new triforium the appearance of a moulded basis of the clearstory. Thus he obtained a grand single member, predominant by its largeness of design in association with a group of combined elements, that between them occupy an equal height. In other instances, of which Westminster is one, the divisions were more marked in the upper half, and the sequence of heights from above downwards was very exactly in the order and proportion of two for clearstory, one for triforium, and three for pier arch. It is questionable whether these proportions were quite the best, but such is the value of variation by simple numbers that they were certainly compatible with noble and happy effects; one consequence of their adoption was that the ratio of one to two was established between the height of the pier arch and that of the central nave. The value of this in ultimate effect was dependent on many other adjustments, as the relative widths of pier and nave openings, and the relative acuteness of their arches. What we are now concerned to remark upon is the unity which is compassed when a definite proportion brings the several features or elements of a composition into a whole by a dependence on one of marked superiority.

This arrangement is most effective when so managed, as it is at Westminster, that the triforium attaches itself most intimately to the division of the pier arch; the special clearstory is then proportioned to the lower division as 1 to 2, and the mere trivial division into plain halves loses in importance.

But here again we are struck by more than an analogy,—by a correspondence with a proportionate division which is most important among those which confer the vigorous expression of unity upon the so complex human structure. The erect form is also approximately halved by a transverse line across the symphysis of the os pubis; but the entire figure is divisible into another pair of segments still more essentially antithetical from characteristic contrast of functions and dignity; the harmonious union of these by virtue of a definite proportionality at once subserves conjoint action and declares itself in expressive beauty. This capital association is between what may be called the nobler and the servile divisions of our structure; of these the upper comprises not only the head, but the great cavity of the abdomen that houses heart and lungs,—the great vital, sympathetic, and intelligent centres,—and limited by the intermediate diaphragm, is in immediate connexion with the most complicated activity of the arms and hands; the lower division comprises the inferior and, we may say, more ignoble portion of the trunk that subserves the ministry of animal sustenance and growth, together with the lower limbs,—the organs of the comparatively simple functions of locomotion. The proportionate height of the upper to the lower division in the developed and well-grown adult will be found, we believe, very accurately as 1 to 2,—the nobler segment being just half the height of that which, for convenience, we have called the servile.

Further illustration might be derived from the proportionate division of the face in beautiful examples, but enough has been adduced to set forth the principle which it is our present purpose to insist on,—the principle which is the very soul of that great quality,—which is generally referred to and well recognised, even by those who would be at a loss to define it,—as breadth. Breadth in an artistic composition is opposed to the scattered, the frittered, the disconnected, it implies a unity by which even an assemblage of multitudinous details is brought through whatever secondary groupings into one final, pointed, and forcible expression. Such is the characteristic of those works in which the marvellous energies of nature appear to culminate, the consummate embodiments of powers most varied and complicated for the noblest and most admirable purposes, in which at last the intimation of purpose seems to lose itself in effulgent beauty. Such harmonies only subsist in nature, and thence only in art also, for which nature gives the lead, in virtue of a truly hierarchical dependence in proportion of all parts among each other, and then of a progressive closing up of such dependence until all fall together into that single dominant and comprehensive proportion,—simple in any case, and accurate whatever its terms,—which is the last expression of definite truthfulness and exalted aim. Breadth in other arts,—as, for example, in painting, where it depends on proportion of light to shade, of warm colour to cold, and so forth,—must be estimated by refined perception; it is in music and in architecture alone that it is amenable to a definite numerical test.

"THE RENAISSANCE IN ITALY."

THE third volume of the work in which Mr. Symonds is ably and brilliantly illustrating the great age of intellectual vigour in modern Italy which has been long known as the Renaissance, is devoted to a consideration of that epoch in regard to the development of the fine arts.* It is this side of the Italian Renaissance epoch which is most popularly appreciated. For one person who is familiar with Politian and Ficino, and their relation to the spirit of classic literature, there are twenty who are well acquainted with the styles and productions of the leading painters who take so great a place in the history of Italian culture, and with the new development which architecture received at the same time. Mr. Symonds does not, however, content himself with merely going over the facts of what is now a more than twice-told tale. He does not pretend to trace in detail the history of the Italian arts, but rather to define their relation to the main movement of Renaissance culture. "Keeping this, the chief object of my work, in view, I have tried to explain the dependence of the arts on Mediæval Christianity at their commencement, their gradual emancipation from ecclesiastical control, and their final attainment of freedom at the moment when the Classical revival culminated." The fulfilment of this scheme, as the author is careful to point out, involves some notice of the Mediæval period, out of which the Renaissance was evolved; and, in fact, the appearance, even in the midst of the Mediæval period, of a thought and sentiment distinctly allied to what was afterwards to develop into the full Renaissance, has been before made evident in Mr. Pater's thoughtful volume of Essays in the Study of the Renaissance,—a book which has influenced recent opinion on the subject very much, and the trace of which seems apparent in some of Mr. Symonds's pages.

In reference to this view of the relation of the art to the thought and feeling of the period, Mr. Symonds's first chapter, entitled "The Problem for the Fine Arts," forms in a sense the basis of the whole volume, and is very comprehensive in the survey of the subject. He dwells on the peculiarly æsthetic character by which Italian culture has been distinguished from the thirteenth to the seventeenth century, to a degree found in no other people since the Greeks. So much is this illustrated in the literature of Italy, for instance, that critics in whom sensibility to artistic form in expression is not predominant, find in the Italian poetry "a lack of substantial qualities," which might be supposed to argue a want of real depth of feeling. Here our author thinks that the plastic art of the period throws a light on its poetry, and it is by familiarity with the works of their artist contemporaries that we come to understand that the poets were not so much unable as unwilling to go beyond a certain circle of effects. Everything they treated was to be brought within the compass of certain confines or boundaries proper to literary form in poetry; and hence arises, to the critics and readers of a more impassioned and less æsthetic age, a feeling of coldness and limitation in the *genre* of Italian poetry of the Renaissance. The secret is, that the poetry of the epoch, like every form of expression, was that of a people with whom the artistic idea of life was always predominant.

In devoting himself principally to the consideration of painting, as the central and peculiarly characteristic art of the Italy of the Renaissance, the author has, however, undertaken to indicate some of the preliminary stages by which this peculiarly æsthetic principle, as mani-

* Renaissance in Italy: the Fine Arts. By John Addington Symonds, author of "An Introduction to the Study of Dante," &c. London: Smith, Elder, & Co. 1877.

fested in the works of the great painters, emerged and developed itself from the more religious or ecclesiastical aim which the earliest efforts of painting in Italy obviously show. The first object of the pre-Renaissance painters was to embody the ideas evolved by Christianity. But in so doing, through the medium of an art which works by imitation, more or less complete, of human form, they almost involuntarily, and of necessity, helped to humanise religion.

"Christian and Pagan traditions came into close contact, and contended for the empire of the newly-liberated intellect. During this struggle the arts, true to their own principles, eliminated from both traditions the more strictly human elements, and expressed them in beautiful forms to the imagination and the senses. The brush of the same painter depicted Bacchus wedding Ariadne, and Mary fainting on the hill of Calvary. Careless of any peril to dogmatic orthodoxy, and undeterred by the dread of encouraging pagan sensuality, the artists wrought out their modern ideal of beauty in the double field of Christian and Hellenic legend. Before the force of painting was exhausted, it had thus traversed the whole cycle of thoughts and feelings that form the content of the human mind. Throughout this performance, art proved a powerful co-agent in the emancipation of the intellect; the impartiality wherewith its methods were applied to subjects sacred and profane, the emphasis laid upon physical strength and beauty as things good and desirable, the subordination of Classic and Mediæval myths to one æsthetic law of loveliness, all tended to withdraw attention from the differences between Paganism and Christianity, and to fix it on the goodliness of that humanity wherein both find their harmony."

And in time this bodily element in painting became a sore trouble and bewilderment to the ecclesiastical mind. The St. Sebastian of Fra Bartolommeo, Mr. Symonds mentions, painted in the cloister of S. Marco, became a snare and a stumbling-block to souls, as was discovered through the avowals of fair penitents in the confessional. This twofold view of painting, from the artistic and the religious side, and the bewilderment as to motive which it gave rise to, is humorously portrayed in the soliloquy poem of Filippo Lippi by Mr. Browning, the only contemporary poet in England who seems thoroughly at home in the spirit of Renaissance painting, and has, indeed, done much to suggest to his readers its true aims and intellectual character. His Filippo Lippi complains grievously that he was condemned by the brethren for painting real people when he ought to have painted idealised saints—that was not the way, they said, to "instigate to prayer"; and he goes on,—

"I painted a Saint Lawrence six months since,
At Prato, splash'd the fresco in fine style:
'How looks my painting, now the scaffold's down?'
I ask a brother. 'Hugely,' he returns.
'Already not one phiz of your three slaves,
Who turn the Deacon off his toasted side,
But's scratch'd and prodded to our heart's content,
The pious people have so eased their own,
With coming to say prayers there in a rage:
We get on fast to see the bricks beneath.
Expect another job this time next year,
For piety and religion grow i' the crowd—
Your painting serves its purpose!' Hang the fools!"

As the author remarks on a further page, "whatever painting touched became by that touch human; piety, at the lure of art, folded her soaring wings and rested on the genial earth. This the Church had not foreseen." But, on the other hand, Church feeling determined the path of Renaissance art to a degree which the great painters of the full period of the Renaissance were probably hardly aware of. It was owing to the influence of the Christian spirit that the calm and reserved expression of physical beauty which satisfied the Greek sculptor could not any longer be the full end and aim of art. There were deeper feelings to portray, feelings which could not be realised through mere perfection of nude form, or in the repose of expression which sculpture demands. They required a medium capable of more varied and impassioned and pathetic expression of countenance than sculpture could supply, and hence it came to pass that those who gave the initial direction to the art of the Renaissance were led to look to painting rather than to sculpture to enable them to realise their aim, and the former became the characteristic and dominant art of Italy, the latter taking only a secondary place, and achieving remarkable and unquestionable triumphs only in some more or less isolated instances.

But before tracing the course of Italian painting in detail, our author devotes a chapter to architecture, as that one of the fine arts which is always "the first to emerge from barbarism in the service of religion and of civic life. A house, as Hegel says, must be built for the god, before the image of the god, carved in stone or figured in mosaic, can be placed there. Thus Italy, before the age of the Renaissance proper, found herself provided with churches and palaces which were destined in the fifteenth and sixteenth centuries to be adorned with frescoes and statues." The attempt to generalise as to the development of architecture is beset with more difficulty, in regard to Italy than in most other cases, from the variable nature of the style and aims of her architects. There is no one great central style like that of France and England in the Mediæval times; but rather tentative and half-formed styles, each bearing the partial impress of some manner of building which is to be found more completely developed elsewhere. Thus we have the Lombard Gothic of the towns of North Italy, the partially Orientalised style of Venice; "while at the other end of Italy, at Palermo, close beside the ruined colonnades of Segesta, Norman kings were embroidering their massive churches with Saracenic arabesques and Greek mosaics, interspersing delicate Arabian tracery with rope patterns and monsters of the deep, and linking Cuphic sentences with Scandinavian runes. Meanwhile, at Rome, tombs, baths, and theatres had been turned into fortresses. . . . No other style but that of the imperial people struck root near the Eternal City. Among her 300 churches, Rome can only show one Gothic building." Amidst this various tendency in point of style, Mr. Symonds thinks that we can regard as a fixed tendency throughout Italy, a bias towards the forms of Roman building, which became in the time of the Renaissance scientifically apprehended, and determined the taste of the whole nation. This is a somewhat lax, but certainly effective and comprehensive method of stating the case, and one which blends itself logically with the main argument and purpose of his book. More complete is his method of distinguishing between the genius of Northern and of Italian Gothic: the Northern Gothic church being, as he puts it, like a body with several members, the southern church an accretion of beautiful atoms; the former impresses us by its one presiding and architectonic idea, the latter by isolated details in which the mind and taste of individual artists appear. The connecting link between this rather aimless and multifarious period of Italian architecture, and the scholastic style with which the name of Palladio is associated, Mr. Symonds finds in such a manner as that of Sansovino at Venice; but this appears to us to have had too partial a sway to be put in so important a place: it is Venetian rather than Italian; and is in some respects a finer style than the more western architecture of Italy ever developed. The Palladian architecture appears to us to be much more closely connected with the literary movement of the later Renaissance epoch than with any immediately preceding developments of architecture on Italian soil. It sprang from the revived reverence for Classic antiquity, which led to the systematic study of Vitruvius and his precepts as the only safe guide in attaining to the corresponding spirit in architecture; and the parallel between architecture and literature might be traced in the defects as well as in the benefits arising from this study, as Mr. Symonds, indeed, seems to indicate when he says "in proportion as architects learned more about Vitruvius and scholars narrowed their taste to Virgil, the style of both became more cramped and formal." The cause why Palladio should have been chosen, in England especially, as the nominal representative name of the revived style, is suggested in the facility with which his principles could be assimilated. "Depending but little for effect upon the arts of decoration, his style was easily imitated in countries where painting and sculpture were unknown, and where a genius like Jean Goujon, the Sansovino of the French, has never been developed. To have rivalled the façade of the Certosa would have been impossible in London; yet here Wren produced a cathedral worthy of comparison with the proudest of the late Italian edifices." This is letting down both Palladio and Wren a little too much. We take it that Palladio impressed his manner and name on the period, because, with all his short-comings, he was a man of genius, though working, in some respects, in the wrong path; and that the London cathedral is a great thing, for a similar reason, that Wren was a genius. Why either he or Inigo Jones should be put in a category below Jean Goujon does not quite satisfactorily appear. The concluding sentence of the chapter on architecture is worth noting. The author places on record his adherence to the view, already sanctioned by leading names among our writers on architecture, that the architectural results of the Renaissance will have, and deserve to have, more permanence than its literary results, and that the Renaissance architects really created a new common style for Europe.

"With all its defects, it is not likely that the neo-Roman architecture, so profoundly studied by the Italians, and so anxiously refined by their chief masters, will ever wholly cease to be employed. In all cases where a grand and massive edifice, no less suited to purposes of practical utility than imposing by its splendour, is required, this style of building will be found the best. Changes of taste and fashion, local circumstances, and the personal proclivities of modern architects, may determine the choice of one type rather than another among the numerous examples furnished by Italian masters. But it is not possible that either Greek or Gothic should permanently take the place assigned to neo-Roman architecture in the public buildings of European capitals."

In that case, the "Tite bequest" for the study of Italian architecture may still be of practical use; but the writer is surely not looking very far ahead in his prophecy.

In the chapter on sculpture, which follows naturally upon architecture, we are asked to regard Niccola Pisano as the man who first breathed with the breath of genius into the dead forms of plastic art, who put the artist on the right track of combining the study of antiquity with the study of nature, and who must claim the credit of being the artistic progenitor of Michelangelo and Cellini. In a sense this is no doubt true; but the panegyric quoted from Lord Lindsay, and apparently endorsed by Mr. Symonds, to the effect that Pisano has had a wider and more lasting influence than ever Shakspere and Dante can boast, since whatever excellence has been achieved in modern sculpture throughout Europe is due to the influence which he primarily gave, is surely a wider and more comprehensive assertion than a carefully-balanced criticism would warrant. But the manner in which Christian feeling and moral significance were combined in the work of Pisano with a constant reminiscence of classic models, is very fully brought out, as illustrating not only the nature of Pisano's art, but the general tendency of Renaissance art, even in these its earlier days, to look back to the reminiscences of the art of a great past.

A subject is touched upon at page 126 which has a bearing on what has recently been said in our pages in reference to the relation of the goldsmith's to the sculptor's art. Speaking of Orcagna, who was educated as a goldsmith, and practised sculpture as an accessory, the author thinks that what the artists of Florence gained in delicacy and precision of design by their apprenticeship to the goldsmiths' trade was hardly sufficient to compensate for loss of training in a larger style. "It was difficult, we fancy, for men so educated to conceive the higher purposes of sculpture. Contented with elaborate workmanship and beauty of detail, they failed to attain to such independence of treatment as may be reached by sculptors who do not carry to their work the preconceptions of a narrower handicraft. Thus even Orcagna's masterpiece" (the tabernacle of Or Sanmichele) "may strike us not as the plaything of a Pheidian genius condescending for once to 'breathe through silver,' but of a consummate goldsmith taxing the resources of his craft to form a monumental jewel." The reference to "Pheidias" (since it seems we are to abandon the Latinised spelling) comes curiously apropos of what has recently been said as to the Mycenæ goldsmiths' work and its influence on the great sculptural art of Greece. At first sight Mr. Symonds's remarks would seem to be rather contradictory of our own, but they are not in reality. Our suggestion, which (largely adopted) has been oddly misunderstood in some quarters, referred to a goldsmiths' art practised for a long period previously to the arising of the art of sculpture in marble; Mr. Symonds refers rather to the influence on the individual artist of a previous habit of working in gold. We think he is right, and that training in gold and silver work must tend to lead to a minute and too delicate style, deficient in breadth and grandeur, when the same hands are turned to the treatment of marble on a large scale. Other remarks in the chapter on sculpture are so interesting and suggestive that we regret to have to pass them over hastily. A remark in regard to Brunelleschi's unsuccessful design for the Baptistery Gates is significant. The design is very deficient in repose: "each separate figure has an uneasy action"; and it is suggested that those who have attributed the unrest of sixteenth-century sculpture to changes in artistic feeling wrought by the Renaissance, might think, on examining this plate, that sufficient account had not been taken of the influence of individual artistic temperament. This in-

fluence of individual character is to be traced in higher and more satisfactory instances also; as in the effect which Donatello's powerful and unaffected style had in causing a reaction against the pictorial style of Ghiberti. It is impossible for any one writing of Renaissance sculpture not to be stirred into something like eloquence of expression in regard to the sculptor of "St. George"; and Mr. Symonds is no cold and calculating critic in reference to this noble artist, whom he happily defines as one bent on marking character, and determined to seize the very pith and kernel of his subject; "not one who, if a Magdalen were demanded of him, would consent to model a Venus and then place a skull beside her"; and it is this earnestness and integrity of purpose which is unquestionably the predominant attribute of the works of Donatello, in which the blending of the noblest side of the Gothic spirit with much of the purity of style belonging to Greek art is achieved, in some examples, with almost unequalled success.

In summing up the history of Renaissance sculpture, the author recognises three distinct stages—the architectural, the pictorial, and the neo-pagan; the latter division including the class of works by Bandinelli and others, which he dismisses as having nothing Greek about them but their nakedness, and their association with myths, the significance of which was never felt by the sculptors. These be bitter words, by no means uncalled for; and this division of the subject is doubtless comprehensive up to a certain point,—only, under which of these heads is such an artist as Donatello to come? But let that pass; the chapter is a very interesting one, and full of not a little eloquence of expression which evidently is the offspring of genuine feeling. One passage in reference to the terra-cotta sculpture of Italy is so charmingly written that we may here quote it as a favourable specimen of the literary style of the writer. Terra cotta, he observes, has the charm of improvisation:—

"The hand, obedient to the brain, has made it in one moment what it is, and no slow hours of labour at the stone have dulled the first caprice of the creative fancy. Work, therefore, which, if translated into marble, might have left our sympathy unstirred, affects us with keen pleasure in the mould of plastic clay. What prodigality of thought and invention has been lavished on the terra-cotta models of unknown Italian artists! What forms and faces, beautiful as shapes of dreams, and, like dreams, so airy that we think they will take flight and vanish, lean to greet us from cloister and palace fronts in Lombardy! To catalogue this multitude would be impossible. It is enough to select one instance out of many; this shall be taken from the chapel of St. Peter Martyr in St. Eustorgio at Milan. High up around the cupola runs a frieze of angels, singing together and dancing with joined hands, while bells composed of fruit and flowers hang down between them. Each angel is an individual shape of joy; the soul in each moves to its own deep melody, but the music made of all is one. Their raiment flutters, the bells chime; the chorus of their gladness falls like voices through a star-light heaven, half heard in dreams and everlastingly remembered."

It might have brought no little joy to the unknown artist of the work so vividly described could he have known that his creation would have called forth, more than four hundred years after, such a genuine outbreak of enthusiasm from a Northern visitor of these latter days. We must, however, take leave for this occasion of Mr. Symonds's volume; we have been naturally tempted to dwell a little on the subjects of Renaissance architecture and sculpture, less often handled than painting. We may have space to touch afterwards on what the author does in the way of throwing light on the history and method of the development of painting; but the subject, though so much has been already said about it, will hardly bear handling in a closing paragraph.

We may just add here what is a not unimportant point in regard to a work of this kind, that the writer's impressions of the works mentioned are all direct. "I am not aware," he says in his preface, "of having mentioned any important building, statue, or picture which I have not had the opportunity of studying." The style of the book itself goes to confirm this statement; and it is to this directness of personal observation that some of the pointed and picturesque character of the criticisms and descriptions it contains is doubtless owing.

Mr. Hankey's Buildings.—We are asked to mention that the whole of the girder work, fireproof floors, tanks, supply hydrants,—in fact, all the engineering work,—was designed and executed by Mr. Dawnay, in direct association with Mr. Hankey. The borings for the hydraulic lifts were by Messrs. Easton & Anderson, who are still at work.

THE DURHAM MINING DISTRICT.

WHILST there have been in the last half-century many developments of industry which have materially altered the course of trade, and given birth to new centres of industry, there is none in which during the whole of that period a more continued increase has been known than in the coal-mining district of Durham, and more especially the southern division of that county. It has not built up any one town of the magnitude of Middlesbrough, nor has it peopled perhaps a limited tract of country so fully as has been the case with the iron-mining district about Gainsborough in a much less space of time; but it has caused a wider tract of country to know a continuous growth of its great industry, and to witness an equally continuous upgrowth of its population, and an almost endless addition to its prosperity. Prior to the inauguration of the railway system, the coal trade of Durham was in an extremely limited condition; and that of the southern division of the county was of the most miniature description. The output of coal in the Auckland district, where it had been worked for hundreds of years, was then limited to about 200,000 tons, and the output formed the chief parts of that of the southern division of the county of Durham. Even nine years after the opening of that primeval railway which built up the trade of South Durham, the population, the trade, and the mining industry of that district was most limited. Bishop Auckland had a population of little more than 2,000, instead of four times that number shown by the last census. The mining industry had, it is true, attained the first stage of growth, but there were then under a score of coal-pits working in the district, and their individual output was one limited by the modes of working the coal, of bringing it to bank, and of despatching it. The old-fashioned "gin" supplied the motive power for raising the coal, "corves" were in use still, and the coal thus brought to bank was often despatched to the south on the one available conveyance of the backs of beasts of burden. There was then a limited choice of places for shipment: Middlesbrough had just begun to ship coal in quantity, and the exports of the older port of Stockton were beginning to feel the effect of the rivalry. The coke trade was scarcely in existence, where now it furnishes above 4,000,000 tons yearly. The iron trade had scarcely an existence in Durham,—none in the southern part of the country. The immense iron deposits in Cleveland were then commercially undiscovered, the Wilton Park and Consett works were unbegun, and thus for an immense output of coal there would have been no means of providing a mode of distribution. The few collieries,—largely "land-sale"—in the district employed comparatively few hands,—the number being probably under 10,000 for the whole county, and the seventy or eighty collieries in the county had not a total output much exceeding 3,000,000 tons. There was a little weaving carried on in some of the small towns and villages; West Auckland,—then decaying in importance,—had its few brass foundries; Durham kept its ancient repute, but had not the wealth its coally surroundings now give it; and the whole of the great district to the north-west of the county was then moorland or agricultural, except where the lead-mining industry preserved its old importance.

Perhaps the first cause of the development of the mining district of Durham was the growth of the export trade in coal. Several ports on the east coast and on the Tees began to export coals, and in quantity sufficient to widely influence the output of the county. Thus, Stockton, between 1833 and 1840, raised its shipments of coal from half a million tons to a million and a half, but after that period the upgrowth of trade at Middlesbrough and the two Hartlepools caused the export of coal at Stockton to dwindle, until they are now barely 5,000 tons annually. Middlesbrough also, though it had at one time a coal-shipment trade approaching half a million tons yearly, has found a use for its fuel so large locally that it now ships some 70,000 tons of coal and 32,000 tons of coke yearly only. But at the Hartlepools, there has been a large growth of the amount of coals shipped. Beginning with a few thousand tons, its exports of coal have known an irregular increase, and they are now at the rate of about a million and a half tons yearly. Next in order of time came that influence which has been the strongest, the great industrial development, of the iron trade more especially. Looking only to the county of Durham, where there were two blast furnaces there are now seventy, and the proportion of these in blast may be said in the dullest times to use two million tons of coal. With this growth there has been one equally marked in the finished iron trades, for the three small rolling-mills in the county in the early days of railways, at which there were under 100 puddling furnaces, have been succeeded by twenty-four large ones, using over 1,100 puddling furnaces, and fully equipped with all needful auxiliaries. But in addition to finding fuel for the works of both classes within its older boundaries, Durham supplies also the whole of that needed for the even larger number of works which in a yet shorter time have arisen in the Cleveland district. And there has been an equal growth in allied industries. By progressive steps, with scarcely a break until now, the coal output of the county has gone on increasing. Year by year it has been increasing, more especially in the southern division, which is nearest to the great mass of the iron-works; and thus it arises that the output of the county, the slight nature of which in pre-railway days we have indicated, has now advanced until it produces yearly about twenty-five million tons of coal. Of this about six million tons are produced by North Durham, and the great bulk of the whole—over nineteen million tons—by the South Durham district, which stands highest in the producing ranks of the world. And this great growth has been without a diminution of other industries; for the lead-mining industry of the county still holds high rank; there has been the addition of the quarrying of a large amount of limestone; and the chemical works of the county have been extended, whilst in place of the old wooden ship-building yards, more extensive and more productive iron ones have been placed.

As a consequence of this growth, the whole face of the country has been changed. The proofs of this prominently referred to have been those on the east, but those in the centre of the county and on the west fully equal the better known examples. Instead of a few isolated collieries of small productive extent, there are now in the county about three hundred collieries, and each of these may be said to have become the nucleus of a colliery village or of a town of some magnitude. Along the sides of the older railways traversing the county, there are miles of colliery roads, pit-heaps, coke-ovens, and other tokens of the great industry; from eminences the view is one in which on hill and in valley, mine-mouth machinery is visible, and tall chimneys are projected into the murky air. After having largely developed the district round Auckland,—in a ratio which may be imagined from the statement that one colliery alone, the Adelaide Colliery, has an output as large as the whole district in the days of which we have been speaking,—the remote region near Crook was ventured into, the little valleys near Durham were tapped, and after the interior portion of the county was tolerably well drawn upon, and the demand, up to a year or two ago, seemed to grow, the outer edge of the proven coal-field was again ventured on, and now there are large winnings in progress destined ultimately to largely increase the yield of the county. The reflection of the growth on the population of the county may be judged from the fact that in the decade from 1861 to 1871 the numbers rose from 516,184 to 700,567, but even these figures do not show the ratio of the increase fully, for the lead-mining districts of Teesdale and Weardale were stationary, and the increase was comparatively slight in the agricultural unions of Sedgefield and Chester-le-Street, the growth occurring in the coal-mining and manufacturing districts chiefly. In spite of this vast increase of population, the prosperous state of the coal trade not only kept the pauperism from increasing, but actually diminished it from 19,800 to 16,600; and the rateable value of most of the unions has been swollen largely.

The one black spot in this prosperity is that the sanitary condition of this great mining district is far from what it should be. Many of the mining villages are poorly supplied with water, the sanitary appliances are defective; the cottages are generally old, inconveniently ugly, and devoid of the essential accommodation, whilst there has been, up to the present time, little or no local governing oversight; and the consequences have been seen in high death-rates, and often in the prevalence of epidemic diseases, which were aided, if not engendered, by the crowded state of the house accommodation, owing to the intensity of the demand for

coal, long known, and the consequential demand for labour. That period of prosperity, and of abnormal rates for wages and prices of coal, has passed away for the present; and in the quietude, and even depression, which prevails in the coal trade, earnest attempts are now being made to provide in some degree better local government, to secure something approaching to sanitary supervision, and to obtain that first of necessities for communities,—a plentiful supply of pure water. The process is necessarily slow, owing to the magnitude of the task, but a commencement has been made in earnest, and when returning prosperity revisits the great mining district of Durham, it will in all probability find a much better state of affairs than was known on the last occasion, when the high wages of the pitmen drew scores from other fields of labour to the collieries of Durham.

MEASURING AND WEIGHING THE GREAT PYRAMID.

IN the midst of Eastern questions and perplexities time has been found by those calm observers of human events, the archæologists, to solicit the attention of Europe once more to the subject of the Great Pyramid. In a memoir addressed to the Viceroy, certain learned Frenchmen have drawn his attention to the precision of the English Ordnance Survey, and declared that until the principles of this Survey are followed, and applied to the mightiest monument of Egypt, its exact dimensions will never be positively known. They even suggest that its largest stones, with others graduating down to the smallest, should be weighed to the last ounce, and the two calculations put together in order to solve a mystery of many ages, which the human intellect, after endless guess-work, has been content to leave in darkness. It is precisely ten years since Professor Piazzi Smyth imagined that he had dissipated all the difficulties, and constructed an impregnable theory, which was well received at the time; but ever since erudite critics have been burrowing beneath it, and at length their discontent has burst forth in a preliminary expostulation with the Viceroy, who, it may be feared, distresses himself very little about the matter. They represent that, in spite of modern mathematics, no two travellers, however scientific, have hitherto been agreed as to the measurement of its mysterious proportions; some being careless, others biased, not a few,—even among French *savants* themselves,—falling into palpable mistakes. Professor Smyth himself, indeed, never pretended to more than having measured a number of parts; he never presumed to assert that he had summed up the Great Pyramid as a whole. But the "Egyptian Memoir," as it is styled, asserts the necessity of settling these questions of the world's history at once and definitely, and although a season of political crisis may not be the best opportunity for giving a practical realisation to the demands of its authors, the points they raise, as they were of interest thousands of years ago, may be of still deeper interest now, since the obscurity in which they lie buried has, with every successive century, been increased. No doubt the French memorialists are ambitious of the glory which could not fail in attaching to such a final and crowning expedition; but they admit all the obstacles in their path, multiplied as these have been by every solution hypothetically offered within the last few hundred years. This object in discovering the true meaning of the pyramid is, be it remembered, notwithstanding the latest self-assertion made by the second half of the nineteenth century, by no means a new one; on the contrary, the plea before the Viceroy is based upon a lengthened record of failures. It opens, after generalities, with a recommendation of the French metrical system for the purpose, and proceeds to a disquisition upon metrology at large. A host of quadrators, trisectors, and perpetual-motionists are then dispersed, though what these last have to do with the points at issue could only have suggested itself to the mind of a Parisian mathematician. The *savants* next indicate some truths long acknowledged, namely, that the Great Pyramid differs essentially from all the various structures of a generally similar outward form, to be found in nearly every part of Egypt; that it is the most antique existing monument of its class; that its more modern companions were designed as gigantic regal tombs, or rather, mausolea, and that they were covered with hieroglyphics and representations of Egyptian animal gods. Now, in the Great Pyramid, not a trace, either of hieroglyphy or of idol-worship, is to be detected; nothing, indeed, except the exquisite masonry and the builders' marks. It stands, therefore, alone; without a clue to the dark labyrinth of its interior, or a key to the significance of its strange external proportions. This has been the problem of centuries; this is the problem of to-day; and this is the problem which, the French memorialists say, ought henceforth to be taken in hand, with a determination to solve it. The names, or the generations of its builders, will, in all likelihood, never be known; but it is declared that the meaning of it may be discovered, if specimen-hunters do not, in the meantime, reduce the whole of its mystic outlines to ruin. The casing of hard white limestone, akin to marble, which once covered the entire edifice, is gone, and the exterior stones have been carted away by thousands to build palaces for Pashas in the valley. Upon these, and other circumstances, the newest theorists base their rejection of the theory that the Pyramid was piled up as an astronomical observatory, or for any similar purpose. They rather incline to the belief,—which is an old one, by the way,—that it may have been designed as an almost imperishable record of metrological data, indicating standard units of length, area, and volume alone, or possibly of mass and temperature also, perhaps even approximate representations of the mass and dimensions of the earth itself. They have one thing certainly to say for themselves,—all the previous measurements contradicted each other,—even Professor Smyth's, which were no more than partial,—and they now aim at converting discrepancies into certainties, with or without the aid of philosophical investigators from other countries of Europe. One reason for previous failures, they affirm, is the almost absolute impossibility of procuring uniform scales for weighing the stones, or rods for measuring the distances from angle to angle. It was something like an endeavour to square the circle. The microscopic compass failed them also. But, urge the memorialists, there was a great deal of ignorance mixed up with these proceedings, and the expedition should not have broken down. But how are they, supposing the Egyptian Government to grant them the privileges they ask, to guarantee themselves against the complications which have baffled all previous efforts, the Cockney tourists, each dragged along by a couple of brawny Arabs, exactly where, and at the right time when, an observation might be favourably taken; the trampling down, by unscrupulous boors, of cameras and measuring apparatus; the grasping of an exquisite clinometer, whereby some intoxicated wanderer from a pic-nic party seeks to steady himself; the floors slippery with candle-grease, the roofs rendered invisible by lamp-black, the walls excoriated by English and American vulgarities? For themselves, they are confident that, if the Sultan's representative in Egypt will concede the necessary privileges, they can overcome all such obstacles, and pursue their path of science with perfect equanimity. It might be better, certainly, they add, had Egypt been a French province, though this remark was odd as an argument addressed to the Viceroy; but that is a political idea, apart from the principal topic of the Memorial. This, then, complains that even the most abstruse of existing accounts commence with mechanically describing the process of pyramid-building,—the hewing of a gallery and a subterranean chamber in the solid rock; the accumulating of huge square blocks above, with similar passages running between them, and so forth. But all of that regards the inferior, or imitative structures, and in no respect the Great Pyramid itself, which reared itself unique and undecipherable, amid all the immemorial monuments of Egypt. Nothing has ever been found in its few hollows, although they were frequently pierced for supposed hidden treasures, excepting, indeed, an empty sarcophagus, or chest, or coffer. There are vacant spaces, called at random King's and Queen's Chambers, corridors of singular proportions, relatively, and ceilings varying in size as though indicating a perfect system of measurement. Such, at any rate, is the latest theory; but the French memorialists concern themselves principally with the exterior. They declare that the dimensions on all four sides of the Great Pyramid vary; that its height differs as it faces the cardinal points; that all calculations based upon them are inconsistent with the figures employed in any living science; and that the chief questions bearing upon these points consequently remain unsettled. They enumerate the subtle instruments hitherto employed to obtain a correct determination; they summon astronomy to their assistance to decide whether the Pole-star could have had anything to do with these mystic arrangements; and, finally, they persist in hoping that what they term "the Pyramid standard" may yet be found, and that it divides the year into its proper days. The extent to which they push this belief argues at once a foregone conclusion, and an infinite faith in its reality. But they seem to be in some fear lest the Pyramid, upon being exhaustively interrogated, should decide on behalf of the English yard as against the French mètre; yet, for some time at least, they may spare themselves this anxiety. The Egyptian Government has weightier matters on its hands just now than the weighing of the Ghizeh stones, and a larger labour in charge, perhaps, than that of calculating pyramidal superficies.

THE STATE AND THE FINE ARTS IN BAVARIA.

IN none of the States of Europe has the effect of the individual efforts of the Sovereign to foster the spread of the fine arts been more apparent than in the kingdom of Bavaria. The hearty appreciation and the continuous efforts of the late King Ludwig I., even before his accession to the throne, immensely increased the growth of the fine arts in Bavaria, and gave an impetus to their cultivation, the effects of which, whether in the spread of actual buildings, statues, or pictures, or in the management and teaching of art, are apparent to this hour. Radiating from that notable centre of art, Munich, the fine arts have spread throughout the country; and in a town like Nürnberg, where the mind of the visitor is insensibly carried back for centuries, Mediæval and Modern art now meet face to face in rich abundance. The management of matters concerning art in the kingdom of Bavaria is one of the duties which belong to the Department of the Minister of Education, so far, at least, as any minister has to do with this matter. To what extent the duties of a high public official are involved in fostering art and managing its teachings will be sufficiently shown in touching on the various systems for its encouragement. Suffice it now to say that the Minister of Education is also, so to speak, the head of the art department.

Turning next to the teaching of art, the first and principal institution is the Bavarian Academy of Fine Arts, which was established in August, 1846. A sum of 147,000 marks is allotted annually from the State exchequer to the purposes of this academy; but Mr. Hill, the British Minister at Venice, in his interesting *resumé* of the attitude of the State to the arts in Bavaria, gives no details of its organisation. It is, however, devoted to the teaching of the arts so as to educate painters, sculptors, and architects. Subsidiary to this chief academy come the Royal School of Industrial Art in Munich, the School of Industrial Art at Nürnberg, that ancient city which is worth many miles of travel in itself. Longfellow has excellently described its character in one of his best and best known lyrics:—

"In the valley of the Pegnitz, where across broad meadow lands
Rise the blue Franconian mountains, Nuremberg, the ancient, stands:
Quaint old town of toil and traffic, quaint old town of art and song,
Memories haunt thy pointed gables like the rooks that round them throng.
Here, where art was still religion, with a simple, reverent heart,
Lived and labour'd Albrecht Dürer, the Evangelist of Art;
Everywhere men see around them rise the wondrous world of art,
Fountains wrought with richest sculpture standing in the common mart."

There is also in Munich an establishment well worthy of notice—a school of industrial art for girls, and in addition another institution of a wider character,—the Maximilian Institute. A short description of these establishments will be neither uninteresting to English readers nor without its lessons. The object of the Munich school, as mentioned in its statute of incorporation, is to teach the scholars to practise some one kind of useful or industrial art. Its object is thus twofold. It is primarily an institution for the benefit of trade apprentices and artisans, and also a preliminary school to the Academy. Thus the course of teaching comprises scientific lectures; studies and exercises in art and art technicalities; copying, drawing, colouring, and

sketches for all sorts of decorative ornaments, especially for woven fabrics, and for the colouring of tapestry and carpets; copying figures from the antique and from life; decorative drawing; modelling in clay and wax for decorative purposes; carving and making models for small articles of furniture; chasing, graving, and enamelling; the study of perspective and shading; and the history of art. In this latter department great attention is devoted to the study of architecture; for, in addition to lectures upon the subject of architecture and engineering generally, the higher branches of this art, the architectural styles of antiquity and the Middle Ages, are touched on, and facilities are given for acquiring a proficiency in planning large public and private buildings, and a knowledge of what in Germany is known as "monumental architecture." It will be evident, from this short *resumé* of the objects of the so-called industrial school, that it has a much wider range of teaching than would be implied from its name alone.

The working period of the year lasts from the 1st of October to the 31st of July, but no one is admitted under fifteen years of age. The cost of the education is almost nominal; one florin (1s. 8d.) is paid by way of entrance-fee, and an annual sum of five florins for the course, and even this fee is remitted if it can be shown that the applicant is unable to pay it. The school at Nürnberg is almost similar, except that the course is divided into two terms, and the annual payment for those who are not natives of Bavaria is ten florins, and 8d. a term is also paid for the use of drawing materials. Both these schools, in fact, much resemble the clock-makers' school in the Black Forest, which has done so much in recent years to retain the pre-eminence of that district in the delicate work for which that country has so long been celebrated. It would have added to the interest of this description if the report from which we take these details had given the number and social standing of the pupils attending these schools; for it is obvious that though the expenses are so small, they are intended by the wideness of their teaching to be used by all who wish to learn art, whether by the youth from the castle of the noble or from the woodman's cabin in the Alps, where the long winter's day is spent in wood-carving. These industrial schools are under the immediate control of the Minister of Education. The girls' school at Munich is similar in its objects and in its course of study, though this is not quite so wide as in the boys' schools. These industrial art schools, in addition to the sums obtained from the pupils' fees, receive from the State a sum of rather more than 150,000 marks.

The Maximilian Institute is subsidiary to the State schools, but differs from the Academy in being a private corporation. It was founded so recently as 1864 in memory of King Maximilian II. Its object is the promotion of those forms of industry which require a considerable degree of art-education for their proper execution. This object is sought to be obtained not only by ordinary teaching, but by giving scholarships, or rather stipends, for one year, to deserving students who are recommended to the Minister of Education by the masters of the school. These prizes are of a twofold character, travelling and school: the first of the value of 400 florins; the second, 200 florins. In the first case both the line of travel and the work are fixed by the director of the school. In all probability the chief value of these annuities is that capable students have the opportunity of studying for a year longer than they would ordinarily be able to do. But if these travelling stipends are much used by the artisan and operative class it must clearly have a large effect in liberalising and enlarging their ideas on art and industrial matters, and might be well imitated in this country, where insularity is in many respects an industrial evil.

We now come to what may be termed the indirect education of the nation. This is done by means of devoting sums of money to the encouragement of art and by means of galleries of art.

In the first of these classes, a sum of rather more than 2,000*l.* a year is devoted to the encouragement of art, which is appropriated to the purchase and erection of works, paintings, and sculpture of a monumental character. This object is practically carried out by inducing the parishes (*gemeinde*) to erect or purchase works of art, to which the State gives a large or a small contribution; by this means a general and wide-spread interest in artistic matters is created throughout the country. This fund is nominally under the control of the Minister of Education, but practically of a committee of experts, which consists of two painters, two sculptors, and one architect, and two "reserve" members. Of these persons the Academy of Fine Arts and the Munich Society of Artists choose each one of each class, whilst the architect is nominated by the Society of Architects and Engineers. It should be added here, that all plans proposed by the parishes (*gemeinde*) have to be submitted to this committee, who act for the Minister of Education. Much, of course, must depend on the manner in which this body execute their duties, but the supervision of such a committee, combining official responsibility with private intelligence and culture, must have a valuable influence in improving art in local places, where it would be exposed to the influences of ignorant enthusiasm or opposition. When one observes some of the so-called local improvements in this country, one could wish that some such body would superintend the proceedings of many local committees of selection. This committee also allots stipends and prizes to the Academy students, and pensions to those artists whose meritorious careers have been terminated by the creeping on of old age.

Another committee, of seven members, consisting of officials and private artists, under the control of the Director of the Royal Picture Galleries at Munich, superintend the Bavarian National Museum, and the other celebrated galleries of Munich, Nürnberg, and Augsberg. This committee, under the able lead of its present chief, Dr. von Hefner-Alteneck, has been of invaluable service in spreading a knowledge of the fine arts, not only in Bavaria, but in other countries. For, however perfect the purely teaching system may be, its value is greatly minimised without a corresponding efficiency in the arrangements of examples of what has been taught. To a foreigner, it hardly seems to be wise to have two committees for the encouragement of art and the superintendence of the galleries, as it must be apt to engender jealousy, and tend to a want of system.

It is obvious that, from what has been said in this and in a preceding paper, both Bavaria and the Netherlands are in some respects superior to England in the systematic form in which the State and the arts are connected, and in the manner in which the growth of the fine arts is encouraged; and it is quite clear that the last fifty years have seen in both these countries a remarkable advance in the interest of the Government in the arts, which is a pleasant contrast to the equally great strides made during the same period in the warlike matters.

CONSTANTINOPLE: AN ART THOUGHT ABOUT IT.

IT would be, perhaps, impossible to find a greater contrast between the past and present, and between old ways of work and artistic action, and those now in vogue, than is to be found in an antique and unimproved, or but partially improved, town or city. Nor can there be a greater difference between two things than between the plan of an antique town and that of a modern one, wherever it may happen to be. It will certainly not be necessary to go far for proof of this dictum, for but a slight glance about us is enough, and by going but a little further and deeper into matters, it gets to be yet more and more convincing and striking, and full of instruction. We might cite not a few proofs of this by mere reference to the new and old in town building here and all about us; nay, in London itself—between its quite new and improved portions and the remains of what it at one time was. Compare the west with the east end of huge London town in the laying out and planning of its streets, and in methods of house planning and building. Improvement there doubtless is, and certainly ought to be, though there may be difficulties and doubts here and there; but of the differences between the two ways of work there can be no sort of doubt.

And if this can be seen with so much plainness even here where all things are new, and where all that is of the past is so rapidly disappearing, how much more so is it when we go to such a spot as Constantinople, wherein is so much that is veritably of the past, and all but elsewhere forgotten, but yet existing and living, not as mere antiques, but in daily and hourly use and want. Anything almost to be got at by curious search, or by accident, about so famous a spot must be now of more than usual interest, for who can tell, or guess even, at the final outcome of what is daily going on in relation to it? It is worth a few words, that is certain, even if but of somewhat doubtful aspect here and there, for in the act of getting rid of so much that is needful to be got rid of, in the ways of the old world, there is danger of destroying not a little that is good, and that cannot, as things are, be in any way adequately replaced. Constantinople city is full of such, and the more it is examined in detail the more there is yet to be found in it that is of itself. Though the fact be familiar enough, it is as well to note that Constantinople is a sea-girt city. On the south there is the Sea of Marmora, and on the north the Golden Horn. No spot for a city could be more happily chosen. "I could hardly retain power to breathe," says the author of "Anastasius," when he first saw it, "and almost apprehended that in doing so I might dispel the glorious vision, and find its whole fabric only a delusive dream." But, indeed, there is no fear of that, for the plan of its building, whatever its inconveniences, puts doubt out of the question; the accidents of building, if we may use the phrase, make commonplace in it, or about it, impossible. We would here give a few details. No two things can be more unlike than a map of a modern and "improved" town, and one of Constantinople. It is impossible to find a straight street in it. In an antique map of it which lies before us such a one cannot be found, a little bit only here and there. It would almost seem as though this strange city had been built, not street by street, but house by house, each house coming in, so to phrase it, separately, and put down just where the fancy of the owner guided it, and there left it, the pathway only being looked to and kept open! The oddest of all possible turnings, and beginnings, and endings, are perpetually met with. These curious streets, too, have no names, for the most part, and the bye-lanes or ways none. A mosque, or the aqueduct, or the site of a great fire, may help to guide, but there is nought else.

It would, indeed, be difficult to understand how this magnificent site for an imperial city could have been missed, not only in its first beginnings as a human settlement, but by those who have successively occupied its ground; and it is hard to see how a regular system of house-building could be made to suit it so well as that which has been thus accidentally adopted. The very waterway itself, dividing as it does the city into its three divisions,—Stamboul to the south, Pera to the north, with the Golden Horn between them—the harbour of Constantinople—and Scutari to the east, with the Bosphorus dividing it from the two first-named divisions,—these alone make this famous city unique, and give to it a character special to itself,—a world-famous city.

We do not here pretend to do more than to make note of a few matters not as yet, perhaps, sufficiently dwelt on; for the time may, perhaps, come when this city, as it even now is, will give place to that course of improvement which is now-a-days so fast making all things and places alike, and copies of each other. This, it needs hardly be said, has been commenced even here, and is slowly, it may be, going on, especially in the immediate neighbourhoods of the Imperial Palace and the Government Offices and soldiers' quarters. The great and devastating fires, too, which every now and then occur, destroy whole neighbourhoods, and leave, as may be seen on any ordinary map, large spaces of vacant and waste ground. There is one such now to the north of the city, and a still larger one to the west,—indeed, stretching from one end of it to the other, leaving but a few narrow streets to connect the city itself with that part of it which abuts on the walls and fortifications. There is another, too, all but as large, to the east, between the Valideh Khan and the quarter in which the Seraglio and its gardens are situated. Very much that was noteworthy must have been destroyed here, and many a curious Byzantine remain and Turkish irregularity must have perished in the flames. Many of these huge and all-wasting fires would seem to have been caused purposely, and it is impossible to suspect otherwise here and there. A recent frightful conflagration all but touched the mosque of Santa Sophia, and the equally remarkable, though not so well known, mosque of Sultan Ahmed.

Nothing can be more expressive of the place itself, or more in harmony with the planning of the city, than the Constantinopolitan house architecture. We are speaking here of the genuine and purely native work, and not of the imported and "improved" ways of doing things. A gateway,—as to a mosque,—is as thoroughly

indigenous and Turkish a work as one of its minarets; and the narrow street in which it is built, and the houses in it, all harmonise together, and form a picture *per se*, unlike anything else in Europe. And then the style and planning of the houses are purely Eastern; every house is a distinct idea, and built apparently for some special and individual use and purpose. There are no rows of equally built and regularly disposed houses in the older quarters of the city. It is the Past in the Present! We are here referring, and it is necessary to note this, to the purely native work, as it yet exists in the city itself, in Scutari, on the opposite shore of the Bosphorus, and in a corner of Galata, and where the irregular street-planning, or rather absence of all planning, yet exists. To the north of Galata, or Pera, all is *new*, as is so much in and about the Royal Palace and gardens. For a mile round Pera all is modern, and of to-day, and the ground laid out and covered with "villas" and gardens, as are also the shores generally of the Golden Horn and the Bosphorus. It is in the purely *native* art and system of house building, and in "Turkish" art, that the interest lies, as we are here looking at it.

It would be difficult to characterise distinctly, without copious illustrations, the architecture of Constantinople, or to do anything like justice to it in so few words, but a little may be better than nothing. Turkish art, like so much else that comes of the past, and is special to a race, is fast disappearing, and giving place to that generalised idea of art which is fast spreading everywhere. In it, and we here confine ourselves to the inherently national work, we may see the rough wooden construction which makes up the architecture of the narrow ways and streets, and which, details differing, was common once on a time more or less over all Europe. This by a natural process of growth, and with added details, goes far to make up the more imposing architecture of the better and more important parts of the city. The growth from the one out of the other is here in Constantinople plainly enough visible. The Turkish builder has thought for himself, at least here. And next, and as a final outcome of it, there is the architecture of the mosques, and gateways, and other more especially public structures. Some of the entrance-gateways to the mosque precincts, such as that to the Santa Sophia, show special and individual characteristics, and are in idea thoroughly Eastern, and of the race who built them. Language, indeed, itself cannot more thoroughly and completely individualise and characterise a people than do their art and architecture, if they be but left to their own special course and growth. Evidence of this there is here, it is certain, but not so much as might be.

We have thus ventured to call a moment's attention to the individuality of the Turk as an artist and architect, and to hint that he has powers of his own, competent to produce work special to himself, and that this work is worth the looking at, if not the attentive study, of the student of art. We do not intend by this that Turkish art or architecture is to be copied and reproduced in other countries, and under other conditions, but that it should be looked at for its own special sake, and thus to show that those who have produced it have thought for themselves, at least here. What the fate of the Imperial city may be in the future who shall venture to say? But while it yet lasts in its at least partial integrity and individuality it is well worth the going through and the looking at; and it is a pity indeed that we know so very little about it in detail. We may look with some wonder on a map at the tortuous windings of its irregular and narrow streets, interrupted only by a mosque here and there, and may wish in vain to see a little more in and about the old Seral, and the more secluded and less known of the mosques round about it,—but little more of certainty is to be gained thus. An accurate map, even, is a desideratum, strange to say; and we have none of those elaborate measured drawings of its buildings which most other European cities have afforded. The City of the Sultan is well worth a little active painstaking at the hands of those who have opportunities and capacities for the work.

Testimonial to Sir John Steell, R.S.A.—On the 23rd ult., at a meeting of the acting committee of the proposed national testimonial to Sir John Steell, R.S.A., it was reported that the subscriptions promised to that date amounted to 1,930*l*.

PROPOSED GREAT IRRIGATION WORKS FOR THE RHONE VALLEY.

For some years the breeding of the silkworm and the cultivation of the vine and of the madder-plant in the valley of the Rhone have suffered from various causes. The result has been a loss in the three branches of industry of about 3,200,000*l*. yearly. It may be guessed what an amount of suffering such a reduction must be causing to thousands of families depending for their support upon them. M. Aristide Dumont, civil engineer, has proposed to cover this deficit by raising the cultivation of the soil and the breeding of cattle, as well as providing a remedy for restoring to health vines attacked by Phylloxera, by means of large irrigation works. His project, including the construction of an irrigation canal 310 miles long, is ably set forth in an article in the *Revue des Deux Mondes*, by M. F. Vidalin, of which we propose to give a short summary.

The importance of the project is evidenced by the facts that it has already been submitted to the Conseil des Ponts et Chaussées, that twenty-four local committees have been formed, instructed to collect data as to the consumption of water and its distribution, and that subscriptions have been received for the irrigation of 13,000 hectares (32,125 acres) of soil. It is pointed out that those most interested in the great undertaking are the railways, on account of the increased transport of agricultural produce; the landed proprietors, on account of the greater yield of forests, meadows, and vineyards; the different communes, by increasing the facilities for the supply of water; industry generally, by placing larger moving power at its disposal; trade and commerce, to both of which a new means of communication will be opened; and finally, the country as a whole, by larger receipts flowing into the public exchequer in the shape of increased tax-paying power.

The cost of construction of the principal canal and its feeders is estimated at 4,800,000*l*., of which the State is to contribute 1,200,000*l*., equal to a third of the outlay for constructing the principal canal. The remaining 3,600,000*l*. are to be raised by subscription, to be paid back in ninety years, in annual instalments of 54,000*l*., with interest at 4½ per cent.

The canal is to branch off from the Rhone below Vienne, near the rocks of Condrieu, and thence to follow the left bank of the river, with a fall of 0·24 mètre per kilomètre (15·26 in. per mile). The fall of the Rhone exceeding this ratio, a considerable difference in the two levels would soon be established. The canal is to extend above Valence and Montbéliard, to cross at the defile of Mornas in large syphons to the right shore, and to draw on its further course towards the most important towns of Southern France, Nimes, Lunel, Montpellier, Beziers, and Narbonne. With a length of 310 miles, it would affect 220,000 hectares, or 543,650 acres, of soil to be irrigated, and offer a water supply to the 500,000 inhabitants of the above-named towns.

It is proposed to take from the Rhone 30 cubic mètres (6,600 gallons) per second, and the same quantity from other rivers met with by the canal in its course. It is shown that the flow of water of the Rhone is 400 cubic mètres (88,000 gallons) per second, that the Cavour Canal takes 110 cubic mètres (24,210 gallons) from the river Po, and that the canal constructed at the foot of the Himalayas takes from the Ganges seven-eighths of its volume, or 44,000 gallons per second, in order to irrigate the so-called Doab for a length of 372 miles. The whole consumption of the Rhone Canal during the summer months, from April 15 to September 15, is estimated to be 930,000,000 cubic mètres, and during the remainder of the year 700,000,000 cubic mètres, corresponding to the proportions of the flow of the Rhone, which, as is well known, is mainly fed by the glaciers sending their waters down valley during the hot season of the year. During summer the meadows, during winter the vineyards, are to be irrigated. The yearly closing of the canals would have to take place in winter.

If for a surface representing a hectare 10,000 cubic mètres of water are reckoned for irrigation, only 62,200 hectares could be watered in summer, and in case of more being required, the contents of the Rhone alone would have to be drawn upon, as it would not be advisable to withdraw more from its tributaries, on account of the works the power of which they supply. The requirement for a hectare of vineyard is estimated to be at least 6,000 cubic mètres.

The rate of payment per 10,000 square mètres to be irrigated is fixed at 63 francs, without regard to their mode of cultivation; in Upper Italy it is stated to be 75 francs. Irrigation would raise the yearly rent of a hectare of dry soil from 50 francs to from 150 to 200 francs. The power to be let out for industrial purposes for fifty years is estimated at 5,000 horse-power, a rent of 200 francs per year and power being expected. It is hoped that, in consequence of the great saving effected (a horse-power, if steam is applied, costing at least 500 francs), a large number of industrial undertakings will spring up between Vienne and Mornas, along the Paris-Marseilles line of railway. The new irrigation canal would offer to navigation between Condrieu and Mornas a way of transport, nearly 50 ft. wide and 10 ft. deep, which, with little extra cost, might be made one of the most perfect waterways in existence, and which it might be desirable to continue as far as Marseilles and the Mediterranean. Its execution would ensure to sea-going ships of not more than 300 tons burthen the traffic between Havre, Paris, and Marseilles, compete with the St. Gothard Railway, and be to France a peaceable revenge for Sedan.

Of the great works to be undertaken in connexion with the canal, the great syphon nearly two miles long, and to be constructed of sheet-iron, near Mornas, is especially mentioned. The inlet to the pipes is to be situate in a gigantic reservoir placed 230 ft. above the level of the valley; the pipes are to cross the Rhone on a bridge, and the water conducted in them is to be emptied into a large basin on the other side. The cost of the syphon is estimated at 280,000*l*.

WASTE OF WOOD.

CONTINUING our observations on the decrease of wood, recently commenced (p. 526, *ante*), we would say that a discussion of this economically important subject becomes all the more valuable if it is associated with the consideration of measures to be taken against it. There is no longer any doubt that the stock of wood in all countries has been steadily declining, nor that the conditions which have caused this decrease are still in operation, and that consequently also in the immediate future the consumption of wood will exceed the growth. It has been said that the price of a commodity is the best and safest regulator. If, for instance, the consumption of grain exceeds its production, a rise in prices is a natural consequence, which, on the one hand, tends to restrict consumption; while on the other production is stimulated, thus restoring the balance. But this comparison will not hold good in the case of wood. In the first place, a long space of time elapses before wood grows to such proportions as to make it available for the uses of life and industry; great difficulties have to be surmounted, moreover, and large sacrifices of time and money have to be made before tracts of land which have once been denuded of trees are rendered once more fit for the profitable production of wood. A very good example of this is the whole of southern Europe.

But the consumption of wood cannot be restricted by legislation or regulations. An attempt of this kind would probably land us at the point of the, to us, ludicrous laws of dress issued during the middle ages. As long as wood anywhere is the cheapest and most convenient material for building of any description, so long will it be so used; the only effective check to waste will be the normal rise in prices. A proof of the correctness of this view is supplied by the use of fir sleepers, in place of those of oak, the latter wood having become too dear; and the time is not far distant when, with more perfected methods of impregnation, other quicker-growing kinds of wood will be employed.

Although it is, therefore, impossible to operate against the waste of wood by legislative means, much may be effected by instruction and by a good example, and in this endeavour the press may render efficient aid. It should be the aim of every educated person, as one of our contemporaries remarks, to convince landholders and farmers that the spoliation of woods and forests by grazing cattle in them, and the use of leaves for litter, is an economical mistake, and is irreconcileable with a high state of agriculture. The following quotation from the well-known work of H. Settegast, "*Die Landwirthschaft und ihr Betrieb*," will show what enlightened agriculturists think on the subject:—"Where agriculture is not self-supporting, but, to be remunerative, is to be succoured by begging from woods and forests, or by waging open war against

them, we have to deal with an unsatisfactory condition, with a pinching poverty, devoid of intrinsic merit, and without claim to existence." It need not be further mentioned here, because too well known, what great hindrances the grazing of forests and the use of leaves for litter are to the production of wood. Agriculturists ought further to be made to understand that disafforesting and the conversion of the ground so gained into arable land, if the soil is at all poor, is also an economical mistake, because its strength, without manuring well, — manure being generally scarce in such districts,—is soon exhausted, and the arable land thus obtained in a very short time produces less than formerly the forest. We should further endeavour to enlighten agriculturists that they are advancing their own interests if they diligently plant with trees every eligible place, without deteriorating the arable land.

ROOM VENTILATION.

MOST persons admit that rooms should be ventilated, and yet in practice room-ventilation is neglected. There are a door, a window, and a fireplace to most rooms, but no special means to change the air at the level of the ceiling. Hence the oppressive condition of the internal atmosphere of a sitting-room or bed-room after occupation. It has over and over again been asserted that burning gas in rooms injures books, pictures, and furniture. A recent inquiry into this question has, however, shown that it is the excess of heat caused by want of ventilation, and not necessarily the burning of gas, which has caused the injury. The temperature in a room of 12 ft. vertical height will frequently vary 20°; that is, will be 60° at 5 ft. from the floor and 80° at the ceiling,—and in many instances, on special occasions, the ceiling temperature will rise to 100°. Libraries have been examined both in America and in England to ascertain the cause of rapid decay in the bindings, both where gas has been in use and where not, but where the ceiling temperature has been high for want of ventilation, and in both cases the injury is reported to have been due to the high temperature and baking effects of the heat rather than to the gas or to any of its products, as sulphur.

We shall some day arrive at the conviction that every room, public or private, must have means to change the air at the highest points of room, water-closet, or staircase, without causing a direct draft; and if proper openings are provided, protected, and attended to, there will be less of injury to books, pictures, and furniture, as also fewer headaches.

The question may be asked,—How shall the ventilation be effected? Well, this will depend upon local specialities and fancies. There are Sherringham's, Tobin's, and Watson's, as also many other modes, patented and not. For bedrooms an opening from the room to the corridor outside, protected by perforated zinc, will answer, and at the top of a staircase there may be means for permanent ventilation round the skylight, or an opening through the ceiling. For cloak-rooms, water-closets, and at the top of staircases, there may be fixed openings which cannot be closed. The writer and some of his personal friends in town and country have had such openings, winter and summer, for more than twenty years, direct to the open air, with nothing but permanent benefit. The inlet is so arranged as not to permit of a direct draught which shall inconvenience. Colds arise and are the result not so much from temperature as from injudicious and underclothing,—thin shoes, bare necks, and light dress,—when special protection to secure bodily warmth is required: low temperature in a bed-room better fits healthy people to endure low temperature out of doors. Ventilation, if a direct draught is avoided, seldom gives cold, and when it does underclothing is to blame,—a warm shawl would have been a safe protection. Our dwelling-house construction is too air-tight; plaster and paint make the top of a room an inverted hot-air receiver.

Royal Albert Hall. — Amongst various events fixed, the examination of the Cambridge Higher Examination of Women will be held in the rooms of the Royal Albert Hall, from June 16th to 23rd. The Sunday organ recitals, we are glad to hear, are to be resumed. Mr. H. H. Statham will give a short series, commencing on Sunday afternoon, the 17th. Tickets are easily obtainable from seat-owners.

THE KOLOWRAT-RING, VIENNA.

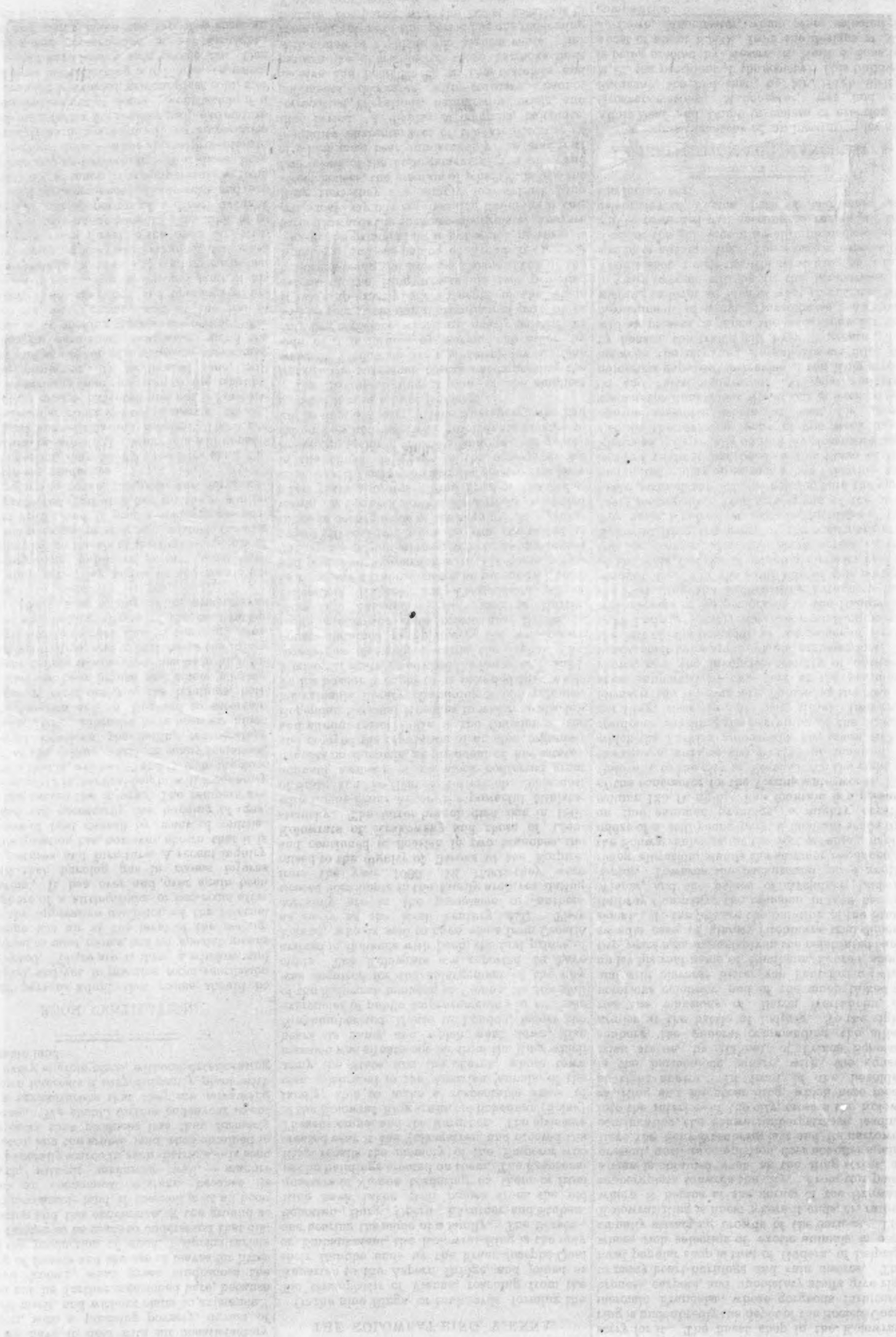
OF the nine Rings, or *boulevards*, forming the *Via triumphalis* of Vienna, reaching from the Augarten to the Aspern Bridge, and joined at their Danube ends by the Franz-Josephs-Quai or Embankment, the Kolowrat-Ring is the only one bearing the name of a family. The Börsen-, Schotten-, Burg-, Opern-, Kärntner, and Stuben-Ring have taken their names from the old quarters of Vienna bordering on them or from public buildings erected on them. The Franzens-Ring recalls the memory of the Emperor who created near it the Volksgarten, and erected the Theseustempel and the Burgthor. The sponsors of the Kolowrat-Ring are an old Bohemian (Sclav) family, able to make a respectable show of men celebrated in the Austrian annals of the army, the State, and the church, whose town mansion was situate not far from the Ring which bears its name, and which went down, like Northumberland House in London, before the exigencies of public improvements; in the case of the Kolowrat mansion at Vienna, its downfall was required for the enlargement of the city circle. The Kolowrats are reported to have arrived in Bohemia with Lech, the first prince of Poland, who is said to have come from Croatia as early as the sixth century A.D. They certainly are in the possession of authenticated documents in the family archives dating from the year 1000. In 1590 they were raised to the dignity of Barons of the Empire, and continued to flourish in two branches, the Kolowrats of Krakowsky and those of Liebsteinsky. The latter branch died out in 1861 with Count Franz Anton, the powerful Minister of State, and the rival of Metternich. This most eminent member of his stock conferred great benefits on Bohemia, as president of her estates, and enjoyed the reputation of an able organiser and administrator. He is the founder of the Bohemian National Museum, to which he also left his valuable library, containing 40,000 volumes. To his honour it ought to be recorded that, while Minister of State, he advised the Emperor Franz I. to exercise clemency towards the Italian Carbonari detained at Spielberg, the well-known rock fortress and state prison near Brünn, in Moravia. Assisted by such men as Hartig, Pillersdorf, Kübeck, and Ficquelmont, all of more or less advanced views, he pursued a liberal and progressive programme in his home policy during his administration, which he conducted from 1826 to 1848, when he was compelled to retire in consequence of the revolutionary movements. A Count Kolowrat-Krakowsky, who died a few years ago, was Grand Prior of the Bohemian Grand Priory (the name of Austro-Hungary in the official language of the order) of the Sovereign Order of Maltese Knights. His youthful nephew and heir was unfortunate enough to kill in duel a young Prince Auersperg, who had insulted him in a fit of jealousy.

The Kolowrat-Ring is one of the smallest links in the handsome cestus encompassing the waist of Vindobona like a glittering jewel. One side of it is formed by seven, the other by only five mansions, which are nearly palatial, as will be seen from our illustration of part of it. It takes up exactly one-sixteenth of the whole extent of the Ring streets; its two principal buildings being the Adelige Casino (Club of the Nobility), and the palace of Archduke Ludwig Victor, the principal façade of which, however, is turned towards the Schwarzenbergplatz. A severe critic may say of the remaining buildings in this Ring that they are simply four-storied Ring street houses, the erection of which falls into the first years of the enlargement of the city, and of which most bear unmistakably the stamp of insipidity characteristic of the architecture of that period. A display of columns, balconies, terracottas, caryatides, balustrades, oriels, and pediments, decorated with statuary, cannot deceive the beholder as to the tasteless and pattern-like character of those barracks built with a view of realising the highest rents. But the architecture of that period has one redeeming feature, compared with the latest creations of Vienna architects,—they rest upon their own walls, and not upon stilts reaching through two stories, between which goods are ostentatiously displayed in shop-windows. It need hardly be emphasised that the ground-stories of the Kolowrat-Ring do not serve as living-rooms. Shop follows upon shop, and *cafés* and *restaurants* alternate. But the brilliant Ring street (unlike the Paris boulevard) is not a favourable site for business. The best houses and firms who have moved their businesses to the Ring are mostly sorry for it. The finest shop in the Kolowrat ring is undoubtedly the depôt of the Société Commerciale Française, whose gorgeous furniture, bronzes, carpets, and upholstery stuffs give rise to many heart-burnings and vain desires. The most popular shop is that of Gudera, of Leipzig, whose rich selection of exotic animals is continually attracting crowds of the curious. The Kolowrat-Ring is finest where it ends, or, rather where it begins at the corner of the Schwarzenbergplatz, towards the city. From this point a view is obtained such as the Ring street, at present, until its completion, does not offer again. Here the Schwarzenbergplatz and its narrower continuation, the Schwarzenbergstrasse, leading into the interior of the city, crosses the Kolowrat-Ring and Kärntner Ring, which here meet at right angles. In front of the beholder is the harmonious square, with the equestrian statue, by Hähnel, of Prince Schwarzenberg, the general commanding the allied armies at the battle of Leipzig. To the right rise the mansions of Baron Werthheim, of notorious celebrity, and of the much talked of and still cleverer Ritter von Pont-Euxin (who, under his real name of Ofenheim, figured, about two years ago, unenviably in the celebrated bank swindle case, of almost Titchborne-trial dimensions). To the left are the building of the State Railway Company, the mansion of the banker Wiener, and the palace of Archduke Ludwig Victor. Towards the background, on a gently rising elevation, stands the summer residence of the Schwarzenbergs, at the foot of which, in the midst of a still young park, a fountain sends up, on fine summer evenings, a mighty crystal column 125 ft. high. This fountain is a present of the contractor for the Vienna waterworks, Mr. Gabrielli, to the city of Vienna. To the right of the square, next to the Werthheim mansion, in which the Turkish ambassador has taken up his residence, marking the beginning of the Kärntner Ring, rises grandly the Hôtel Impérial, formerly the Würtemberg Palace, as the coat of arms supported by two deer at the pediment shows, now the favourite hostelry of crowned heads, their heirs-apparent, and ambassadors. To the left of the beholder, at the palace of Archduke Ludwig Victor, the Kolowrat-Ring opens, which seems to be prolonged to the Danube by the Park-Ring and Stuben-Ring, extending in a straight line. On the right side of this portion of the Ring, the end of which disappears behind the far horizon, after the short extent of the Kolowrat-Ring, the green of the Stadtpark predominates, a refreshing oasis in the midst of the dusty metropolis. This spot is one of the most lively parts of the Ring street, for here the most frequented routes cross each other. During the last few years it has become the Corso of the Viennese. Especially on Sunday afternoons, and also in the evening hours of fine week days, crowds assemble which, at least for hours, assume the dimensions which one is wont to see on the Paris boulevards. If once the still numerous gaps on both sides of the Ring street between the city and its suburbs are filled up by houses, the traffic will be still greater, but still at present it lacks the conditions for the development of a lively intercourse. Any one wishing to form an idea of what the normal life in years to come will be in the Ringstrasse of Vienna should visit the Kolowrat-Ring on a fine spring or autumn day. The stranger especially, if under the guidance of a well-informed *cicerone*, will be rewarded with passing in review all the celebrities of Vienna, both of the male and the female sex.

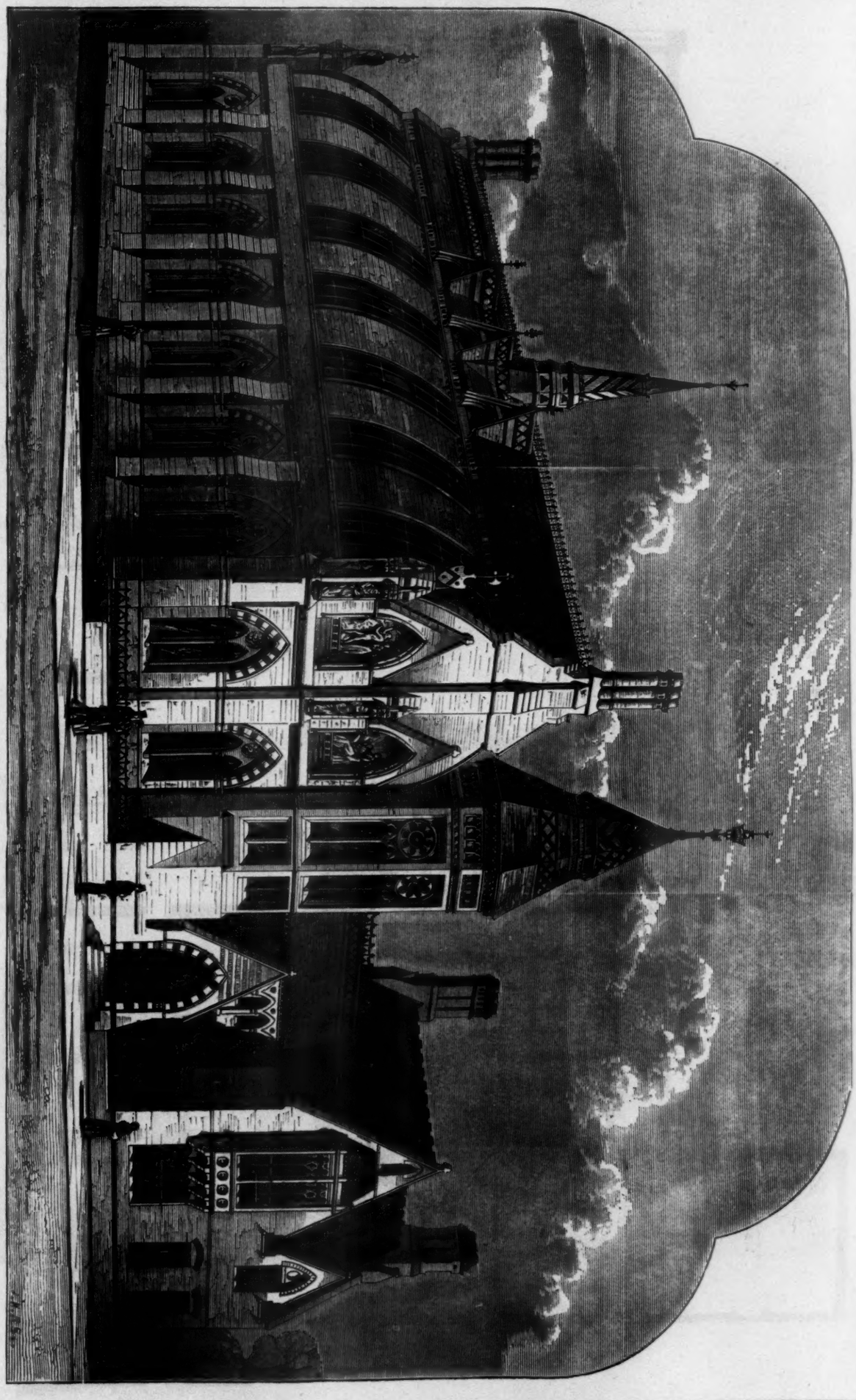
AN INSTITUTION FOR MANCHESTER.

THE foundation-stone of an institution for the Adult Deaf and Dumb in course of erection in Grosvenor-street, Manchester, was laid on Saturday, the 2nd inst., by Mr. Hugh Birley, M.P., the president of the society. This building is being erected by Messrs. R. Neill & Sons, at a cost of about 3,500*l*., from the designs of Mr. J. Lowe, Manchester, which were selected in competition.

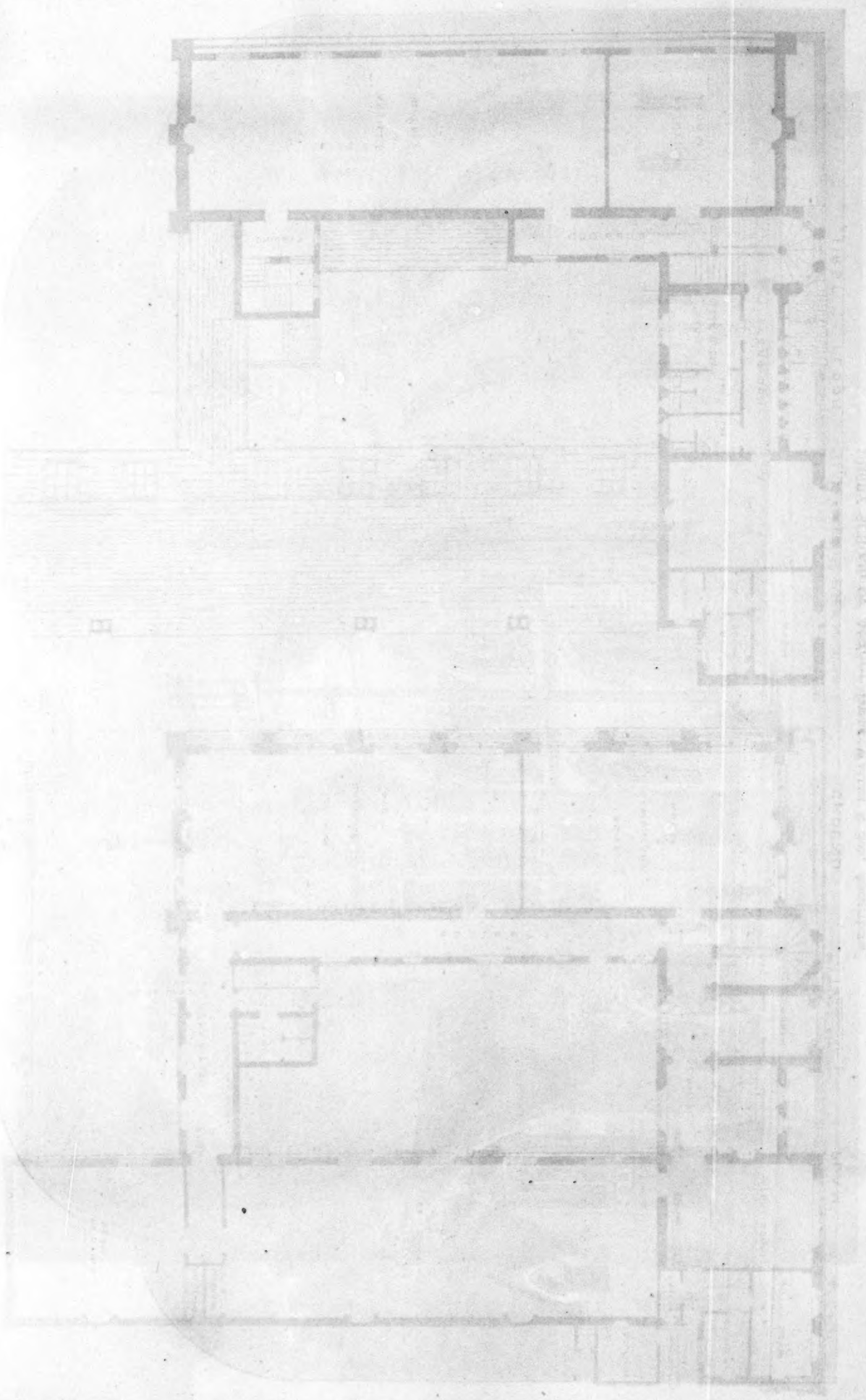
The principal elevation, fronting Grosvenor-street, is faced with Yorkshire stone, and is somewhat ornate. The building is designed in the First Pointed style of Gothic architecture, and internally is arranged in the basement as a gymnasium; on the ground-floor as a reading-room, coffee-room, secretary's office, class-room, and conveniences. The upper floor is devoted to a lecture-hall, with galleried floor. It is octagonal in plan, lighted from the roof, and has a vestry and other requirements.

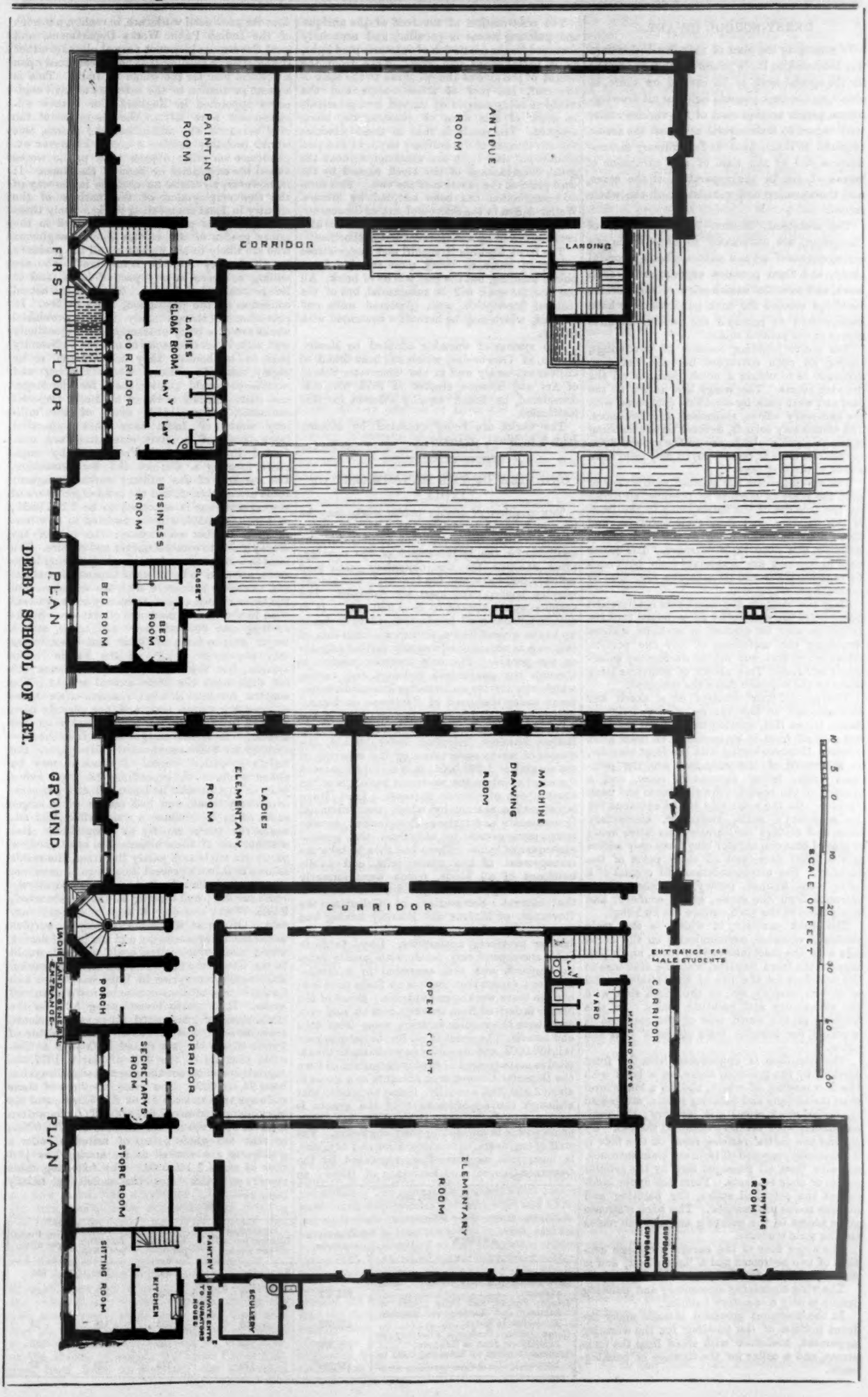


PART OF THE KOLOWRAT-RING, VIENNA.



DERBY SCHOOL OF ART.—MESSRS. WALLER & SON, ARCHITECTS.




PAINTING ROOM
ANTIQUE ROOM
CORRIDOR
LANDING
FIRST FLOOR PLAN
LADIES CLOAK ROOM
LAV
LAV
CORRIDOR
BUSINESS ROOM
CLOSET
BED ROOM
BED ROOM
LADIES ELEMENTARY ROOM
MACHINE DRAWING ROOM
CORRIDOR
ENTRANCE FOR MALE STUDENTS
LAV
YARD
PLATES AND CASTS
CORRIDOR
OPEN COURT
ELEMENTARY ROOM
PAINTING ROOM
SIDEBOARD
SIDEBOARD
LADIES & GENERAL ENTRANCE
PORCH
CORRIDOR
SECRETARY'S ROOM
STORE ROOM
SITTING ROOM
KITCHEN
PANTRY
PRIVATE ENTR TO CURATORS HOUSE
SCULLERY
GROUND PLAN
SCALE OF FEET
0 5 0 10 20 30 40 60
DERBY SCHOOL OF ART.

DERBY SCHOOL OF ART.

IN arranging the plan of this institution care was bestowed on those points which are essential for the special work to be carried on there, in obtaining the best possible light for all drawing-rooms, proper arrangement of the various rooms with regard to their several uses, and the access required to them, both under ordinary circumstances and at the time of any exhibition of works of art, in the separation of the sexes, and the warming and ventilation of the whole school.

The architects, Messrs. Waller & Son, of Gloucester, are understood to have made the arrangements of art and science schools a special study, and from previous experience in such work, and a careful examination of the various buildings erected for such purposes, they have endeavoured to combine the several requirements in the present edifice.

The entire building consists of two wings, having an open courtyard between them, so arranged as to obtain a north light for all the drawing-rooms. The wings are united at the east and west ends by corridors, connected with the necessary offices, staircases, and entrances. The elementary schools, devoted to the teaching of the younger students, are on the ground-floor, so that the more advanced pupils only need have access to the first-floor.

The several rooms are planned with a view to keep the sexes as distinct as possible, all rooms for the sole use of the ladies being in the front of the building, and near their entrance, and those used by males being at the back of the building, and near their entrance. The rooms used in common are accessible from both ends by separate doors, and those on the first floor by separate staircases also.

Only the wing on the north side is at present being built, the plan being so arranged that the buildings may be erected in sections, without impairing the usefulness of any one portion, either when first put up, or during any subsequent addition. This allows of additions being made as the requisite funds are collected.

The ground-floor consists of a porch and entrance-hall in the centre of the building, facing Green Hill, opening on the front corridor, but shut off from it by means of an inner glass screen. Communicating with the front corridor, on the north of the entrance, are the principal stairs, ladies' elementary room, and a passage to the machine-drawing room and back corridor. On the south side of the entrance are the secretary's room, storeroom, elementary room, and cottage for curator, this latter being so placed that the curator may have easy access to the front door, and all other parts of the building. The accommodation will consist of a living-room, kitchen, pantry, staircase, private entrance from the street, and a scullery, and w.c. placed in the yard outside the building.

The back corridor, in which is the male students' entrance, communicates on the north side with the machine-drawing room, and a passage to the front corridor, with the staircase to the first floor for the use of male students, and with their lavatory, &c., on the south side, with the elementary and painting rooms. In this corridor on the south side of the staircase is a recess for hanging male students' hats and coats.

The first-floor is approached from the front corridor by the principal stairs, on a level with the first landing of which, and at a lower level than the antique and painting rooms, are placed the ladies' cloak-rooms and lavatory; the business-room, with lavatory attached thereto. By placing the ladies' retiring-room on this floor it is effectually screened off from the main entrance, and also from all passages used by the general public or male students. From the upper landing of the principal stairs, the painting and antique rooms are reached. The back staircase gives access to the painting and antique rooms for the male students.

The upper floor of the curator's cottage consists of two bedrooms and a linen-closet, and is entirely shut off from the main building.

The wing containing elementary and painting rooms is only a one-story building.

In the basement provision is made under the front portion of the building for the warming apparatus, coal-store with shoot from the main street, and a cellar for the stowage of packing-cases.

The construction of the roof of the antique and painting rooms is peculiar, and especially arranged for the admission of uninterrupted light, as it partakes of one great curve from the height of the sills of the windows to the apex of the roof, the roof of these rooms and the windows being carried on curved iron principals to allow of this form of construction being adopted. The result is that in these windows the advantages of the ordinary skylight and perpendicular side light are obtained without the great disadvantage of the block caused by the wall plate at the junction of the two. This form of construction has been adopted by Messrs. Waller & Son in the Schools of Art at Gloucester, and has been found to answer well. It has also been approved by the Government authorities.

The front towards Greenhill and Degge-street will be of stone, as being most suitable for a public building, but the rest will be of brick. All the interior work will be substantial, but of the plainest description, with plastered walls and ceilings, which may be hereafter decorated with colour.

The system of warming adopted by Messrs. Haden, of Trowbridge, which has been found to answer extremely well in the Gloucester School of Art and Science, erected in 1871, will, it is considered, be found equally efficient for this institution.

The works are being executed by Messrs. John & E. Wood, of Derby.

ONE VIEW OF THE MANAGEMENT OF INDIA.*

THE position of Indian public works may be best understood by taking, as a starting-point of observation, the amount of surplus revenue available for the improvement of the country, after charges for the obligatory (civil and military buildings, and for the main and across-country roads, have been all defrayed. The surplus would appear to be 1,260,000*l.* It is acknowledged on all hands that India is taxed up to the utmost limits, so that no extension of this sum is obtainable from any further imposts on the people. The only increase possible is through the guaranteed railways and canals, which now involve an immense annual disbursement under the head of "interest on loans," paying better, and from an improvement of the rate of exchange between gold and silver. Before, however, bringing under review, the classes of works undertaken on the strength of the surplus of 1,260,000*l.*, it is useful to recount the sums spent on the roads and buildings of the country out of current revenue. Lord Mayo introduced a system by which the Provincial Governments and minor Presidencies receive lump-sum grants in aid from the general exchequer of India. These had then to take the management of the roads, jails, and public buildings of all kinds, which were formerly treated as Imperial works, and conducted from the central Secretariat of Calcutta, the Governors of Madras and Bombay having had to refer there for annual grants, as well as the smaller provincial authorities. Local funds in India correspond very much with county rates in England, and are expended in a similar manner; except that there is no State poor-law, nor are there workhouses in India. Some of the money is derived from an extra cess on land over and above the regular taxation, some from tolls and octrois. The grant in aid for the current year is 1,400,000*l.*, and the outlay on works under the exclusive management of local as distinguished from the Imperial Government amounts at a guess to about 2,250,000*l.* annually. It may be noticed that although the apportionment of the grants is conceded to Local authorities, these have little or no power in appointing their engineers. The staff of engineers, as to composition and numbers, is now, just as heretofore, regulated by the Governor-General and Secretary of State; so that the provincial works are, in reality, a branch of the Indian Public Works Department, and local Governments cannot vary at pleasure either the salaries or grading that have been fixed upon a uniform plan for the whole of India. This is a great protection to the interests of civil engineers appointed in England; for if their advancement were left to the discretion of the civil servants who administer the grants, this would probably receive a check whenever expenditure on other objects than public works suited the exigencies or bent of the times. It is, however, no doubt an obstacle in the way of the free employment of the natives of the country in local engineering works. Only those natives can at present be entertained in the upper grades of the service as civil engineers who are likely to be efficient in all the positions to which they may be transferred, who are willing to serve in any part of India, and to forego local and social ties. These, in the actual condition of the population, must be few. In consequence, though many of the provincial works are of a petty character, and exceedingly well suited to the capacity of natives, sufficiently paid to be honest, they are attended to by highly scientific officers, whose training and experience would qualify them for the larger and more difficult works of a strictly Imperial character. Since 1872, most of the military works of India have been separated from those of a civil class, and are conducted in the Bengal Presidency by engineers, forming a distinct list for promotion. The accounts of the military works throughout India are combined, and the total expenditure of the current year is expected to be 1,231,985*l.*, of which 500,550*l.* will be devoted to new barracks and other muniments; the rest of the money going to establishments and repairs. The local and military works, though involving large sums, are seen to be of an indispensable nature, and so closely connected with the mechanism of the Government as not to be any more optional than in the various countries of Europe. Slight savings may be made here and there, and a larger employment of local native engineers may popularise a part of the Public Works system; but the burden on the revenues will fall with much the same annual weight. The surplus revenue is what remains after these charges have been met, and has already been put at a little above one million and a quarter sterling. It is this margin which furnishes the security for State-constructed railways, and the Indian irrigation works. Operations may be either confined to expending this sum every year, or capital may be borrowed at 5 per cent. in ordinary times, and laid out in much larger sums, so as to produce a wider effect, and advance the works rapidly to completion. But whether one of these alternatives is adopted, or partly one mode and partly the other, the result follows that, with present incomings of revenue, progress in India is limited by the comparatively small surplus; and directly this is all absorbed, Public Works can only bring the country into debt. Of course, if the works paid, the surplus would not be evanescent; and the period during which their construction could proceed would be the longer the more remunerative the works. Engineering enterprise in India has taken two forms,—those of State-conducted and guaranteed works. It is worth investigating how far the latter class, or guaranteed railways and canals, are secured by the revenues. The Minister of Public Works has just stated in Council at Calcutta that up to the 31st of March, 1877, the capital expenditure on the guaranteed railways has been 94,416,000*l.* The gross earnings of these railways are expected to be 8,553,300*l.*, and the working expenditure 4,937,000*l.* The guaranteed interest upon the capital amounts to 4,766,000*l.*; so that the whole group of railways under a guarantee are worked at an annual loss just now of some 1,149,000*l.* The following table shows on what lines the deficiency chiefly occurs:—

* See p. 536, *ante*.

Railways.	Cost per mile in rupees.	Guaranteed Interest per mile per week.	Gross Earnings per ditto.	Working Expenses per ditto.	Net Profit per ditto.
		Rs.	Rs.	Rs.	Rs.
East Indian (Calcutta to Delhi, with offshoots)	232,402	223	320	172	348
Scinde, Punjab, and Delhi (Delhi to Lahore, and Lahore to Mooltan, Kurrachee to Kotri)	172,677	160	232	149	83
Great Indian Peninsula (Bombay to Jubbulpore, ditto to Raichore)	195,572	188	390	168	222
Madras (Madras to Raichore, ditto to Beypoor)	128,764	124	176	129	47

It will be seen at a glance that the primary cost has had nothing to do with the unremunerative returns, as the cheapest lines are the most speculative. The reason of the Scinde and Madras railways being run at a heavy loss is, evidently, sheer want of traffic. The Punjab has a dry climate, and comparatively thin population, with, however, a fairly productive soil. The great distance to be traversed before a market for raw produce can be reached is against much corn being grown for export; while the situation of the province in the most likely part of India to become the theatre of war must deter capital from being freely invested in developing the country. The Punjab has, however, had the good fortune to be lightly assessed, which benefit conferred by Lord Lawrence was not forgotten by the people of the Punjab during the great Indian Mutiny. The Madras Railway seems to have only about a third of the traffic of the Calcutta Railway. This is due purely to the Presidency being unproductive in that ratio. In Madras territory, the peasantry are yearly tenants, paying rent directly to Government officials; and are of course interfered with by these in most of their daily concerns. The land is taken up in very small lots by cultivators, who have no capital but what they borrow at 24 per cent. interest; and the consequence cannot fail to be that their mode of treatment exhausts the land. Not particularly fertile in constitution, Madras soils require careful tillage and ample manuring, which they do not receive. The native population is well-found, peaceable and industrious, but possessed of little means. Along the course of the railway the landscape is exceedingly bare of profitable vegetation, and glares in a fiery sunshine. The villages are assemblages of the poorest hovels; and there is a striking absence of the exuberance that is to be looked for in a tophical peninsula. It is only on the west coast, where land is held by a fixed hereditary tenure that the heights are crowned with forests, and the lowlands are clothed with grass and wave with palms. Over the greater part of the presidency the apparent phenomena are those of rackrent and agricultural neglect. Of course to bring forward crops in such adverse circumstances, manures, natural and artificial, are required to be rolled along by the railway, in all directions; yet scarcely a ton is moved, and nobody appears to be aware of the want. The Madras Irrigation and Canal Company had its dividend of 5 per cent. per annum guaranteed by the Indian Government as an effort to remedy the dismal state of the two worst districts of the presidency, Kurnool, and Cuddapah. These are signally hot, miserable, and unhealthy. Much of their surface is rocky, the deposits are of Cambrian geological formations, and inherently unproductive; whilst almost all the trees there ever were in the locality have been cut down for firewood, and never replaced. There is, therefore, no shade, and the rainfall is scanty and fitful. The company have made a beautiful canal, from an engineering point of view, fully 180 miles long; but the population, it is found, will not buy the water, which would cost them from 4s. to 12s. per acre yearly. The reason is that the soil is so poor that it wants other elements besides water, which the people, if they knew their properties and utility, could not readily obtain. The projectors of the canal seem never to have troubled their minds about the constitution of the land to which water was to be supplied; but until an agricultural investigation has been carried out, and guidance afforded in raising sufficient crops to pay the expenses and yield a profit, and the use of manure is made popular, the works will be a drag on the finances. Though open since 1871, it is estimated that the company's dues for the present year will only aggregate 12,500*l.*; which is less than must be absorbed by the cost of management, leaving 50,000*l.* to be distributed amongst the shareholders out of the general taxes of India, as their dividend. The guaranteed works accordingly are now demanding altogether 1,199,000*l.* from the sum available for expenditure on meeting the interest on loans; and it is unlikely that this burden can materially decrease so long as the Punjab is exposed to the risks of invasion, and Madras remains deforested and fallow.

It is desirable now to pass on to the systems of State railways and irrigation. These constitute the extraordinary works for which, during the past seven years, large loans have been contracted. The chief State railways are:—Lahore to Peshawar; Khandwa to Neemuch, *vid* Indoor, or the Holkar railways; the Indus Valley Railway, from Kotri to Mooltan; the Rajputana Railway, Agra to Ajmere; the Nizam's State Railway, ending at Hyderabad; and the Rangoon and Prome Railway, in Burmah. At the end of March, 1877, there were, it is stated, 800 miles of these State lines open to traffic, and 1,100 miles more were under construction. It is anticipated that by March, 1878, there will be 1,500 miles open and at work. To effect this it is proposed to expend 2,728,000*l.* on State railways during the current year. An idea of the financial result is to be gathered from the consideration that capital to the amount of 14,455,288*l.* has been sunk in construction; while it is estimated that this year, from 1,230 open miles, there will be gross earnings of 675,000*l.*, and net profits of 190,000*l.*; to be tabulated thus for comparison with the statistics of the guaranteed railways:—

	Cost per mile in rupees.	Interest on capital at 5 per cent. per mile per week.	Gross earnings ditto.	Working expenses ditto.	Net profit ditto.
	Rs.	Rs.	Rs.	Rs.	Rs.
State Railways	117,522	113	165	76	29

The aggregate mileage it is intended to construct is put down at 2,550 miles: so that the State railway scheme of India will then have cost 30,066,999*l.*, borrowed at 4½ per cent., returning on current data 395,200*l.* net profit, and leaving 957,810*l.* to be provided by taxation. Sir Andrew Clarke has just expressed before the Governor-General and his council at Calcutta the "wish to see no work of irrigation commenced till those who expected the benefit had either subscribed the capital or had given a guarantee for the interest of the work which has to be undertaken from the loan funds." It seems that up to March, 1877, the construction outlay upon Indian works of irrigation in actual operation has been 10,719,537*l.*, and the net profit for the current year is set down at only 184,867*l.*, or 1¾ per cent. The interest at 4½ per cent. amounts to 482,378*l.*; so that State irrigation involves a money loss yearly of 297,511*l.* It is true that credit is taken in official reports for increased land revenue; and that irrigation works can be made out much more advantageous to the country than this. However, if the Indian Government is unable to dissociate the accounts of irrigation from those of their ordinary rental of land, there will be always a question as to how far enhanced rents have been affected by irrigation; and there will be a suspicion that, as irrigation is now conducted, it is a palliative for radical defects in the Indian agricultural system, quite as much as an improvement standing upon its own engineering merits. Current revenue has, then, in India to defray the balance of interest on capital borrowed for public works, at the following figures, though the canals are flowing and railway-trains running:—

For Guaranteed Railways	£1,199,000
Ditto Madras Irrigation Company	50,000
State Railways	480,487
Ditto Works of Irrigation	297,511
	£2,006,998

The amount of revenue set aside for the interest charges on loans, and applicable to public works purposes, is about 1,777,000*l.*, so that the margin left as surplus is trenched upon, and deducting 229,998*l.* from 1,260,000*l.*, constituting this surplus, the annual public works fund is already reduced to a million, in round numbers, from a million and a quarter. So far, the country appears solvent, and has obtained solid value for the capital expended, although the returns are slow in coming in. Hindustan has been rendered permeable, and the more urgent needs of an exceedingly backward territory will have been fairly met when the schemes in hand are finished a few years hence. But the interesting point to engineers and architects is whether engineering service in India is an expansive or contracting sphere of labour for them personally. The guaranteed railways and canals gave much employment between 1856 and 1871, but upon their completion very small establishments sufficed to keep the works in order, and the surviving engineers had to find occupation where they could. Encouraged by the high price of cotton during the American war, the fixed Public Works establishments of India were enormously increased till from about 360 engineers before the war, the number has risen to about 900 in constant employment, of whom nearly four-fifths have received a training in Europe. The additional engineers were brought out to India mainly to manage the State railway and irrigation works, for which funds have been obtained by raising loans. The revenue assignable to meet the interest still amounts to a million sterling, which gives a run of perhaps seven or eight years at the existing rate of expenditure to the operations of an active and enlarged Public Works Department, supposing the railways and canals continue not to pay. But several causes may curtail the period within which the pace at which the Public Works Department is now working can be preserved. Of late years there have been famines in different parts of India, which have found immense numbers of the labouring classes of the population without any stock of provisions laid by. Money has had to be raised by the Indian Government, not only to keep these necessitous classes alive; but to make up for the loss of revenue that would have accrued by their labour. There being no other permanent resource than the annual surplus, much of the interest of Famine Loans will eventually fall upon funds hitherto available for the edifices of the builder and the constructions of the engineer. Another aspect of the question has to be noticed, quite apart from the occurrence of famines and the loans these entail. Public works have made considerable progress in India, and there are railways or good roads connecting almost all the principal marts. It is clear the majority of the works do not prove at all so remunerative as was to be expected; and that want of produce, with consequent stagnation in traffic and commerce, is the origin of this discomfiture. So that it may be necessary to take breath at an earlier stage than the exhaustion of funds, and turn a large proportion of the capital outlay into channels which will improve the face of the country, and stock the shiny wastes as well as the arable champaign. If engineers are to be fairly prosperous, and realise the anticipations of a career formed when the Indian Public Works Department was augmented, they will have before long to accommodate themselves to what they actually see about them; and address their attention to in many cases novel, but still essentially cognate, branches of practice. When the country is brought up to a condition of productiveness, by an adequate outlay on forest plantations, on manures, and agricultural implements and ameliorations, there will be a chance of carrying out a new series of railways and canals in India of first-rate paying capability.

BUILDING DISASTERS IN AMERICA.

THE failure of a truss in the roof of the New York Post Office, and the fall of the Court House at Rockford, have caused the death of a number of persons. We get the following particulars from the *American Architect*:—

The fall of the Rockford Court House is a serious warning of the dangers of irresponsible management. The building was an elaborate one of cut stone, and its principal feature was to be a square French dome rising above the roof and set on an attic of stone. This dome and its attic rested in front on the outer wall of the building, but the space beneath it was part of a large court-room; and in order to have it unobstructed the return walls and rear wall which should have carried the dome were omitted in the second and third stories, and two iron columns about 30 ft. high were set under the corners. They carried girders, bearing the brick walls in the story above on which the dome rested. The iron columns stood upon brick wall or piers, also 30 ft. high, in the first story. It was these piers apparently that gave way suddenly when the whole attic of the dome, almost ready for the superstructure, with the brick walls, girders, and columns under it, fell into the cellar with about two dozen men who were at work on it, and of whom one-half were killed. The immediate cause of the fall is not yet known; but the construction was evidently of a very venturesome kind, such as should only have been carried out with extreme care and under watchful and skilful superintendence. It resulted, too, it may be said, from a violation in the design of the received canons of good architecture by introducing a useless feature in a position where it was quite out of relation with the disposition of the plan of the building. The superintendence of the building was not given to the architect, Mr. Gay, of Chicago, who had only visited it at intervals as he had been called for in consultation. The building committee had appointed one of themselves as superintendent.

As to the New York Post-office disaster, it

seems pretty clear that however blame may be distributed for the disaster, there was sufficient cause for the fall of the truss in the way in which it was hung. It was not a Howe truss, as was said in the newspapers at the time of the accident, but a suspension truss of the simplest type, with both top and bottom chords of full length, vertical struts, and single oblique suspension-bars, in four panels. The outer end rested upon the upper plate of the mansard, and the inner upon the main partition wall. In such a truss all the strains are finally carried to the ends of the top chord, and the support must be applied there; the object of extending the bottom chord across the extreme panel being only to give opportunity for steadying the truss at the bottom, to keep it in a vertical plane. If the support is applied at the bottom of the truss, it must be transmitted directly to the top by stout struts, which serve not as integral parts of the truss, but merely as shores to prop the upper chord; and which need to be laterally braced at the top and bottom to prevent their being overturned. In the original trusses of the building the upper chord was bolted to the upper plate of the mansard with angle irons at the outer end. The end strut or shore here was carried down to the floor, resting on a bearer, and framed into a triangular brace with an 8-in. channel-bar serving for the contiguous rafter of the mansard, the end of the lower chord being bolted to it, so that the weight on the truss was divided between the strut and the rafter. The strut at the inner end was built solidly its whole height into the main partition wall which carried the floors and roof; and the roof-beams which rested on the top chord were framed and bolted to it. According to the testimony of Mr. Hill, and of Mr. Schumann, the engineer in charge of iron construction in his office, it was discovered after the fall of the new truss that the outer end of it had never been bolted to the roof-plate, that the roof-beams were not bolted to the truss, and that the 8-in. bar and the triangular bracing at that end had been omitted; so that the whole truss was poised upon the top of the end strut, which was 19 ft. long and without any lateral stiffening or support whatever.

There is considerable variation in the findings of the different juries which have investigated the disaster. The coroner's verdict seems to bear with unreasonable severity upon the former supervising architect, Mr. Mullett, under whom the Post-office was built. To turn away from the direct and conspicuous causes of the disaster in order to visit the chief condemnation on lesser preliminary faults takes away from the verdict the judicial character on which its value should rest. It says:—

"The immediate cause of the falling of the said portion of the roof was improper and insufficient construction; but the primary cause of the disaster is attributable to the incompetency of the agents of the Treasury Department charged with the erection and completion of the building. . . . . An excessive quantity of concrete was used in the covering of the roof, and the load thereby imposed upon the iron roof exceeded the weight for which the iron constructed was originally designed, by more than 300 per cent. All of this is owing to the incompetency on the part of A. B. Mullett, the supervising architect in charge at the time the roof was designed, and his local *employés*."

There is no mention of any person to whom the blame of the disaster belongs, excepting Mr. Mullett; yet the facts are, that so long as the building remained as Mr. Mullett designed it, no harm came to it. The verdict adds that,—

"It appears that on the removal of the wall on the fourth story the remainder of the wall on the sixth story was left standing by order of A. B. Mullett, supported, according to his direction, by two light 15-in. iron beams, competent to carry only one quarter of the weight imposed upon them; that this wall was recently taken out to be replaced by an iron truss. . . . . but no special drawing was made for the new truss and its outer support. . . . . It appears that neither the local superintendent nor said iron firm had the necessary technical information to correctly understand the functions of the truss, or how such truss should be constructed, and that in consequence its support gave way as soon as the temporary props supporting the roof-beams were removed."

Mr. Mullett has testified that when he resigned his office at the time the original alteration was undertaken and the beams put in, he recommended that the upper portion of the altered wall should be removed with the rest, and a truss substituted; and that nearly two years later, when under a new appointment he inspected the building, he renewed his recommendation, which was then adopted.

Crippled Boys' Home.—The first stone of the additions is to be laid by the Princess Louise on Tuesday, the 26th inst., not the 20th, as was at first stated.

ASSOCIATION OF MUNICIPAL AND SANITARY ENGINEERS AND SURVEYORS.

THE Home Counties Division of this society held a conference at Ipswich on the 1st inst., Mr. James Lemon, of Southampton, president, in the chair. From a long report in the *East Anglian Daily Times* we note that Mr. G. S. Elliston, medical officer of health, Ipswich, read a paper on "State Medicine and Sanitary Engineering," in which he said that,—"The Registrar-General, in his summary for 1876, says the steady decline in the fatal prevalence of fever in England affords the most satisfactory evidence of sanitary progress; but this improvement is more marked in the large towns, which looks as if the rural districts and small towns did not deal with sanitary defects with the same energy as the cities and boroughs. Although the appointment of health officer and inspector is compulsory in rural districts, there is no provision in the Public Health Act for securing the services of competent surveyors. The so-called parish surveyors are, as a rule, local tradesmen, and know nothing of engineering or the common rules of drainage. In the rural districts I am connected with, I have frequently felt the want of the advice and assistance of a skilled surveyor, and important works of drainage and water supply have been delayed and not carried out in consequence. The appointment of surveyors to combined country districts of large area is much needed, and until rural sanitary authorities can avail themselves of the professional advice of such gentlemen, the sanitary progress of country districts will not keep pace with the towns." The author then proceeded to discuss the various points involved in connexion with the site and construction of dwellings and the removal of sewage and refuse, especially in relation to Ipswich.

Mr. Buckham said that in consequence of the present arrangements for carrying out engineering works in small districts, places having from 1,000 to 3,000 inhabitants, which were supposed to be salubrious spots, were often sources of infectious diseases arising from defective sanitary arrangements. In the matter of medical officers, an inspector was appointed for a wide area at a good salary sufficient to secure the services of a good man; and he suggested that some such plan should be adopted for surveyors. As to the inspection of buildings, the bye-laws were only partially, and not wholly carried out, as Mr. Elliston had inferred in his paper. As to the question of the sewage of Ipswich, the opinions of himself and the medical officer had been almost identical on the subject, that the sewage matter should be turned into the estuary after undergoing some system of precipitation.

Mr. Lobley said he had expressed his surprise before that Ipswich, on a tidal estuary, should contemplate the pail system at all. He saw no difficulty, as a native of Liverpool, and having had ten years' experience in the borough surveyor's office there, in applying the water-closet to the smallest cottage in the town. As to the bye-law, mentioned by Mr. Elliston, allowing the space for a house to be at either side of the building or the back, he should be glad to see that altered so as to have the space at the back.

Other speakers took part in the discussion, amongst them Mr. Piper, who, in reference to the Artisans' Dwellings Act, said he was afraid that Act had brought about a state of things which might press hardly on the poorer portion of the working classes. In Ipswich, houses were being rapidly built, but not such a class of house as was required by the working classes. With the advance which had taken place in the price of bricks and timber it was impossible to build houses of such a class as workmen with their present wages could inhabit. He had hoped to hear some scheme by which this difficulty could be overcome; he thought the only way to do that was to erect the skeletons of a long range of cottages of concrete.

Mr. E. Buckham, C.E., the borough surveyor of Ipswich, then read the following paper on

COST AND SUITABILITY OF TAR PAVEMENTS FOR SUBURBAN PATHS.

To many of the members the construction of tar pavements is a familiar work, but there are others, perhaps, who have not as yet tested their suitability for suburban paths. In some counties, such as Lancashire and Yorkshire, tar pavement is not a matter that would receive much attention; but in the Eastern counties, and other districts not favoured in the same way, and where stone pavements cost seven times as much as tar pavement, the latter is of some importance to towns requiring a clean and economical footway. In Ipswich, the mileage of footways in proportion to the population is very large, the population being 46,000, the distance of streets and roads being about 75 miles. Of this about 22 miles are town streets; and double this distance would represent about the length of paths. Formerly all the suburban paths, as well as the majority of those in third-rate streets, were made with gravel. These, however, were always in a defective state. To prevent mud accumulating in winter, shingle was put on the surface. This shingle in summer-time was disintegrated, and laid on the surface as though it had been strewn with peas or beans. To avoid this, loamy gravel was put on. Then, again, in winter this worked up into mud, and again had to be covered with shingle, and so on alternately winter and summer. The defects gave rise to continuous complaints, and having had experience of tar pavement in other towns, I was induced to recommend it as a substitute for gravel. My suggestion was approved of by the authority, and specimens of the pavement were laid, the first being done by contract at 1s. 3d. per superficial yard, and maintained in repair for five years. This was thought to be too much, and the Sanitary Authority decided to make their own. I have prepared the material in different ways, sometimes using simply pure coal tar; at others, refined tar, and occasionally small portions of pitch, lias lime, and Portland cement in the preparation of it. But in practice (although I use mainly refined tar) coal tar is all that is required, and will make as good a path as with refined tar, or any other admixture. I have two ways of making tar pavements in this borough. One is with shingle,—that is, fine gravel; and the other with slag, which is clinkers and refuse cinder-dirt from factory furnaces. The process of making with shingle is simple, and is as follows:—A fire is made on the ground and covered over with shingle; when this first covering is heated through more is added from time to time, until there are about 10 or 15 tons. For convenience in sifting over the stuff after it has been heated through, it is desirable that the fire should be of an oblong shape, presenting a form something like the mounds under which potatoes or mangold are stored in a field. After the whole has been sufficiently heated to take out the natural moisture, it is sifted, the fine being placed in one heap and the coarse in another. When about one barrow-load of each has been sifted, boiling tar is thrown upon each of them while in a hot state; the whole is then turned over with shovels, and thoroughly mixed. The coarse forms the bottom layer of the path, and the fine the top surface. After a path has been made about ten days it is dressed over the surface with boiling tar and sharp sand or ashes left from the heap of stones after burning. The sand combines with the tar, and fills up the small interstices and produces a smooth surface. In making these pavements from slag it is not necessary either to heat the material or boil the tar. The material collected is turned over so that all the large clinkers are broken into small pieces, after which the whole is sifted over to separate the large from the small, and is then mixed with cold tar (unless the weather is very cold, when it is warmed to make it mix more readily). The material made in this way is laid down in the same manner as described for shingle, but is not dressed on the surface with boiling tar and sand, being better without, but is covered with a copious sprinkling of white Derbyshire spar, which is well rolled into the top layer to relieve the dull, sombre appearance, and give it a pleasant effect. In laying the paths, care should be taken to roll the ground well, and bring it to a uniform surface before the bottom layer is put on, to avoid uneven or soft places, which, if not provided against, would result in the path, after being down for a time, having a series of undulations on the surface. In laying, each layer should be well rolled with a roller of about 7 cwt. The bottom layer should be 1½ in. thick, and the top one 1 in. It is advisable to keep the prepared stuff a few weeks before it is laid down; and although the work can be done at almost any season, spring and autumn are the most suitable, when it is dry, and not too hot. Shingle tar-pavements require dressing over with boiling tar, and covering with sharp sand, from time to time, to preserve the surface, which, if not dealt with in this way, would become rough, by reason of the softer material wearing from between the joints of the stones. The material does not

always turn out equally well. Sometimes a path will not consolidate, and at another time the surface will break up without any, as far as can be seen, apparent reason. The shingle tar pavements cost 9d. per superficial yard, laid complete, and that made from slag 11½d. Preference is given here to those made of slag, which are more costly in the first instance and less durable than those made with shingle, which can easily be understood when the nature of the material is considered. In the first instance we used shingle entirely, but from favourable reports of the Sheffield paths, and from a personal examination, and from the easier mode of preparation, I was induced to adopt their plan. I believe the Sheffield paths are better than those in this town, and I have no doubt it arises from the fact that the material is of a more durable character than can be procured in Ipswich. The cost of these pavements varies according to local circumstances, being as low, in the case of Sheffield, as 7d. per yard, and as high in London as 2s. 3d. From information obtained some time since, I found that the general price of this kind of pavements was about 1s. per yard, exclusive of the cost of preparing the foundation. The price I have given for Ipswich paths includes the foundation. Tar pavements are generally adopted as an improvement on gravel paths, and are not supposed to be regarded as a material to be taken in comparison with asphalte, although I think they bear favourable comparison to many of the more costly pavements, and are, in my opinion, much to be preferred to the common asphaltes prepared from pitch, to say nothing of the difference of cost, and which expands and contracts with variations of temperature. I have tried other materials for making cheap pavements for footways, such as bricks, earthenware tiles, and Portland cement concrete; but the cost, which is about 4s. 6d. per superficial yard, precludes their use for suburban paths, and their durability is not sufficient to allow them to be put in the place of York flagging for main streets. A path made from shingle, and repaired in the way I have described, would last with the ordinary traffic of a provincial town ten years. Paths laid under my directions as long since as this are still in fair condition. It is, however, difficult to say what the life of pavement would be without very careful observations extending over a considerable period, as the duration of any paved footway is simply determinable by the amount of traffic. Having regard to the economy of first construction, reduction of dust and scavenging, and the cleanliness of the path after rain, it appears to the writer that there is no better material for suburban footways than tar pavement. It may be objected that the dull appearance, and the difficulty of repairing them so as to bring the repaired part even with the old, and the disturbance of the paths caused by laying on gas and water, is against their adoption. The first objection can be avoided by using a good covering of Derbyshire spar, and the second applies more or less to any pavement, with the exception of York flagging. When I commenced to lay these paths ten years ago they were rather scarce, and had only been laid to a limited extent in a few towns, but during the last five years they have been very largely extended, and will in future occupy a permanent position among other paving materials for constructing footways in towns; this shows the suitability of the material for such footways as I have referred to in this paper. There are now about fifteen miles of these paths in Ipswich, taking the place of paths which would, if they had not been superseded with this material, have still been muddy in the winter, and so rough on the surface in summer as to make them always more or less unpleasant to walk upon, to say nothing of the indirect discomfort to the inhabitants by reason of additional dirt in winter and dust in summer. The cost of paving this length of footways with other materials would have been so considerable as to have prevented the possibility of doing it, and I look upon it as a great boon to the inhabitants of any town to get such good pavements for suburban paths at such a small cost.

Some discussion ensued, and the proceedings of the day were brought to a close with a dinner.

Witham.—St. Nicholas Church, Witham, Essex, is about to be restored, at a cost of about 1,700*l.*, from plans prepared by Mr. Joseph Clarke, the diocesan architect.

PURCHASED BY THE ART-UNION OF LONDON.

THE following are amongst the works already selected by prize-holders in the Art-Union of London:—

From the Royal Academy.—The Rescue, John Charlton, 200*l.*; Oranges, A. Hill, 150*l.*; The High Hall Garden, Ernest Parton, 100*l.*; Over the Bar, Edwin Hayes, 65*l.*; "Man goeth forth unto his work," &c., A. Stocks, 63*l.*; A Poser, J. H. Barnes, 52*l.* 10*s.*; In Pensive Thought, Jno. Scott, 52*l.* 10*s.*; "We don't want You," J. T. Nettleship, 50*l.*; Rochester, from a Sketch taken in 1857, G. A. Williams, 50*l.*; A Shot for the Golden Ring, A. Phillips, 42*l.*; On the River Brathay, Westmoreland, Wm. Hall, 42*l.*; "The very most interesting Part of the Story," Jno. Ballantyne; The Rabbit Family, T. Earl, 42*l.*; High-street, Ludlow, Louise Rayner, 40*l.*; Dutch River, C. Thornley, 40*l.*; On Duty, R. S. James, 35*l.*; Long Tout Jar, Portland, Alfred Mudge, 25*l.*; Sunbury, A. A. Glendening, 25*l.*; Left Behind, R. S. James, 21; Fishing-boats on the South Coast, A. Hodder, 21.

From the Society of British Artists.—Returning from Market, E. J. Cobbett, 150*l.*; Harvest Time, near Dolgelly, North Wales, A. W. Williams, 100*l.*; Returning from Market, Grenada, Robt. Kemm, 60*l.*; On the River Mole, W. H. Foster, 75*l.*; Highland Washing, J. Gow, 63*l.*; A Welsh Valley, James Peel, 60*l.*; "Buy, Lady," J. Morgan, 60*l.*; Herring Fishing Station on Loch Howrn, Inverness-shire, N. R. Green, 50*l.*; "Where the Green Leaves bud, and the Merry Birds sing," W. Luker, 45*l.*; A Derbyshire Stream, J. Peel, 45*l.*; Cader Idris, North Wales, S. R. Percy, 45*l.*; Last Autumn's Fall, R. Redgrave, R.A., 42*l.*; On the Llugwy, W. Bromley, 40*l.*; Llyn Giverney, North Wales, A. de Breanski, 30*l.* 15*s.*; The Church Pool, River Conway, E. H. Holder, 35*l.*; In the Glen, J. H. Cole, 35*l.*; "Come Along," W. Bromley, 35*l.*; Three Playmates, Miss Redgrave, 35*l.*; Cottage Interior at Kingston Lisle, Berks, A. Provis, 28*l.*; Work and Play, J. Cole, 25*l.*; Clytie (a marble bust), Mrs. Physick, 25*l.*; Widmouth Bay, Cornwall, A. B. Collier, 25*l.*; "You Wild Flowers, I love you right well," Mrs. J. F. Pasmore, 20*l.*; Going to the Fair, E. Fisher, 20*l.*; Valentine's Day, G. H. Barrable, 20*l.*; After Breakfast, A. M. Rossi, 20*l.*; Abinger Marsh, Surrey, W. F. Hulk, 20*l.*

From the Crystal Palace Picture Gallery.—Arrest of Poachers, M. Webb, 150*l.*; A Juggler in full Swing, J. Platteel, 60*l.*; Escape of Prince Charles Edward, McLeod, 50*l.*; The Undercliff near Bonchurch, J. Godet, 25*l.*; Lucerne, E. Myers, 25*l.*; Taking Sanctuary, T. Davidson, 22*l.*

From the Royal Scottish Academy.—Getting Ready, Jno. Charlton, 84*l.*; Coldingham Shore, Berwickshire, Samuel Edmonston, 50*l.*; Kincraig Point, Fife coast, D. Cameron, 35*l.*

From the Society of Painters in Water Colours.—The Plough, A. Hopkins, 100*l.*; Port Eynon, coast of Gower, South Wales, Edward Duncan, 75*l.*; Sunrise at Hastings, Collingwood Smith, 42*l.*; At Whitby, Yorks, C. Davidson, 35*l.*; A Street in Venice, E. A. Goodall, 35*l.*; Church of St. Sauveur, Caen, William Callow, 26*l.* 5*s.*; Karlswood Common, Surrey, C. Davidson, 20*l.*

From the Institute of Painters in Water Colours.—A November Nosegay, Marian Chase, 25*l.*; Derwentwater, Cumberland, J. Fahey, 25*l.*; On Banstead Downs, J. H. Mole, 21*l.*; The Path to Idwal, J. C. Reed, 20*l.*

From the General Exhibition of Water Colours.—Early Morning on the Thames, H. Darvall, 40*l.*; On the Banks of the Usk, Henry Birtles, 35*l.*; A Frosty Day on the Tyne, Thos. M. Henry, 20*l.*

MYCENÆ.

AT the Society of Antiquaries, last week, Mr. C. T. Newton delivered a discourse on the antiquities discovered at Mycenæ by Dr. Schliemann. In the course of it Mr. Newton said that on coming fresh from an examination of Dr. Schliemann's antiquities at Athens and Mycenæ back to the British Museum, he had been struck with the resemblance between certain antiquities from tombs at Ialysos, in Rhodes, with certain antiquities found in the tombs on the Acropolis at Mycenæ. It was the object of the present lecture to draw attention to these resemblances, and so far as possible to demonstrate them by the aid of diagrams of objects in the British Museum and photographs lent for this occasion by Dr. Schliemann. The Mycenæ antiquities consisted principally of gold objects. There were also specimens of pottery, painted fictile ware, engraved gems, and a few objects in an opaque vitreous composition. The gold ornaments, again, consisted partly of personal ornaments and partly of cups and other objects of domestic use. It had not been possible on the present occasion to illustrate all the points of resemblance by diagrams, but only those which admitted of being drawn on a large scale. To make a complete comparison it would be necessary to place side by side a number of small objects from Mycenæ on the one hand and from the British Museum on the other. Thus we find that certain small ornaments, probably pendants of necklaces, executed in gold at Mycenæ, are very similar in character to certain antiquities from Ialysos, with this difference, that the Ialysian personal ornaments are made not in gold, but in an opaque vitreous paste. Again, at Mycenæ there were found an immense quantity of circular discs of thin beaten gold, on which was impressed from a mould some device, such as a butterfly, cuttlefish, or a flower. All these discs have been fastened on some surface underneath, as the holes for the pins remain. From Ialysos we have discs with flowers embossed on them, similar in all but scale; they are rather smaller. We have, too, from the same source, a winged monster embossed on a thin gold plate, very similar in style to the *repoussé* work in gold at Mycenæ. But to pass to resemblances which can be illustrated by diagrams,—the form of the gold cups at Mycenæ is peculiar. There are two dominant types. Both these types prevail in the fictile vases at Ialysos. Here the lecturer showed the forms of these two kinds of cups by diagrams and photographs. It should be noted that these two shapes which occur at Mycenæ and Ialysos do not occur, so far as the lecturer knew, in later Greek art at all, and one of them he has only seen at Ialysos, and in the neighbouring island of Kos. The type of this cup, which has a long stem rising from the foot, was probably originally a ceramic type, and was afterwards copied in metal. But the resemblance of the gold antiquities found at Mycenæ to the fictile ware of Ialysos is not limited to the forms of the cups. The pattern on one of the Ialysian cups shows dolphins running round it, and below a row of birds. Both these patterns occur on the Mycenæ gold cups. Again, one of the prevalent styles at Ialysos is a cuttlefish, as in the diagram before the society. This is a favourite on the gold-embossed discs at Mycenæ already alluded to. On surveying the gold objects of Ialysos, the characteristic of the ornaments generally is a tendency to spirals, not treated severely, as in the later Greek art, but spread over the surface of the objects decorated with a certain vague lawlessness. The intercourse between Mycenæ and Egypt was proved by the occurrence among the antiquities from the tombs of ornaments of an Egyptian character in Egyptian porcelain. At Ialysos was found an ivory box with a peculiar lid, in the form of a duck, which was certainly Egyptian, also a porcelain scarab, with the cartouche of Amenoph III., whose date, according to Egyptologists, cannot be later than B.C. 1130. This comes very near the date generally assigned for the downfall of the dynasty of the Atridæ. Of course, it was quite possible that the remaining antiquities found by Dr. Schliemann might be of later date, but the indication is worthy of note. In the tombs at Camiros was found a scarab with the cartouche of Thothmes III., and one with the cartouche of Psammetichos I. Among General Cesnola's antiquities from Kurion, in Cyprus, were cylinders bearing the names of very early Assyrian kings.

SOCIETY OF ENGINEERS.

"AT a meeting of this Society, on the 4th inst., in the Society's Hall, Victoria-street, Westminster, Mr. Thomas Cargill, C.E., president, in the chair, a paper was read by Mr. Ralph H. Tweddell, on "Direct-Acting Hydraulic Machinery." The author first described the cases in which gearing by shafting, wheels, and belts was used for driving machinery. He then alluded to the advantages of that mode of transmission, especially in large workshops where the machines were placed far apart. After considering the transmission of power by steam for driving small engines on each machine, he proceeded to describe his application of hydraulic pressure to the transmission of the power, and also to working the tools themselves. To illustrate this part of the subject, he described the differential accumulator, by the special construction of which the effect of a blow is obtained, as well as a steady pressure; and referred to the success which has attended the adoption of his hydraulic riveters to this combination.

Great Petroleum Fire in America.—Information of an immense fire is to hand from Petrolia, Butler County, Pa. On the 19th ult. a severe thunderstorm passed over the district, which is a great oil centre. A flash of lightning struck a large tank containing 22,000 barrels of oil, which ignited. Efforts were at once made to overcome the fire, but it caught two of the tanks, one holding 25,000 barrels of oil, which was completely destroyed. The other, however, was extinguished by the application of steam. The burning oil ran down the creek for about a mile, setting on fire and destroying everything it came in contact with. The total quantity of oil destroyed was 47,000 barrels belonging to the United Pipe Line, and twelve wells and tanks belonging to other companies. The town of Trautman itself suffered to the extent of $30,000.

BURY ST. EDMUNDS.

THE town surveyor, Mr. John Crofts, departed this life on the 20th ult., in the 69th year of his age. Mr. Crofts was brought up as a land surveyor, and was appointed by the council as borough surveyor nearly twenty years ago; and during that time extensive waterworks, and some sewer works, have been completed. According to a correspondent, these sewer and irrigation works are rather defective, as much of the sewage runs into the River Lark navigation. There is some talk of the county magistrates and the adjoining landowners entering an action against the Bury Urban Sanitary Board, in consequence of the dangerous and offensive smell from the sewage.

It is the general opinion of the ratepayers that the town council should advertise for some experienced man, one who understands the work, and who can take levels properly, and so on.

The paving and surveyor's rates at Bury are high, and there is universal dissatisfaction among the ratepayers in consequence.

LIABILITY OF LOCAL BOARD TO "QUANTITY SURVEYOR."

WAGHORN *v.* THE WIMBLEDON LOCAL BOARD.

THIS case (in the Queen's Bench Division, before Mr. Justice Manisty and a common jury) raised a question of considerable importance to architects and surveyors, and to those concerned in the building trade. We adopt the *Times* report. The plaintiff, Mr. Joseph Waghorn, is a "quantity-surveyor." The defendants are, by statute, the Burial Board, as well as the Local Board, for the district of Wimbledon. In 1875 they instructed their salaried surveyor, Mr. Rowell, to prepare plans and specifications, and to procure tenders, for the erection of a cemetery chapel. These instructions were embodied in a resolution passed at a meeting of the Board. When Mr. Rowell had prepared the plans, he instructed the plaintiff to take out the "quantities," and he advertised for tenders in the *Builder*. Several builders sent in tenders, having used the quantities taken out by the plaintiff in arriving at their estimates. The defendants did not accept any of the tenders, the amount of the lowest tender being higher than the sum which they intended to expend. The case for the defendants was that they never authorised Mr. Rowell to employ the plaintiff to take out the quantities.

Several architects and surveyors were called for the plaintiff, who stated that the business of a quantity surveyor was quite distinct from that of an architect, and that it was necessary that the quantities should be taken out to enable builders to tender. They also stated that the custom was for the builder, when sending in a tender, to add the charges of the quantity surveyor to his estimate, and that if the tender was accepted he paid the quantity surveyor. If, however, none of the tenders were accepted, the building owner was liable to pay the quantity surveyor's charges.

At the close of the plaintiff's case it was submitted that there was no evidence that the defendants had authorised Mr. Rowell to employ the plaintiff to take out the quantities.

His Lordship, however, ruled that, as they had instructed him to procure tenders, and as tenders could not be made without quantities, they had impliedly authorised him to get the quantities taken out.

It was then submitted that the defendants, being a corporation, could only contract under seal, and there being no contract under seal here, the plaintiff could not recover.

His Lordship ruled that as the defendants had by resolution impliedly authorised Mr. Rowell to get the quantities taken out, and had had the benefit of the work which had been done, their objection was not tenable.

Judgment was accordingly entered for the plaintiff for the amount claimed (170*l.* 10*s.* 1*d.*).

As the defendants were anxious to take the opinion of the Court, his Lordship stayed execution for four days, but said that it must not be supposed that he entertained any doubt on the matter.

Critical Condition of a Church at Kennington.—From the facts disclosed at a meeting held last week, the determination to rebuild the front of St. James's Church, Kennington Park-road, has not been arrived at a moment too soon. The Rev. B. Harris, the vicar, who occupied the chair at a meeting of the parishioners for the purpose of forming a committee for rebuilding the front of the church, stated that the rebuilding of this part of the edifice had become a matter of absolute necessity. A resolution was carried to the effect that, as the meeting recognised the necessity of building a new front to the church, a committee be appointed, with the object of carrying it out. Mr. Ewan Christian, architect, has furnished designs for the rebuilding of the church, which include a tower, with pinnacles, to the new frontage.

MASTERS AND MEN.

Aberdeen.—The Aberdeen masons have sought an advance of from 7½d. to 8d. per hour; and, as the masters have not granted the demand, a strike and lock-out have ensued, by which about 600 men are thrown out of work.

Huddersfield.—The strike of masons at Huddersfield, which commenced on the 1st ult., has been settled. The men had previously received about 32*s.* per week in summer and 29*s.* in winter, and struck for 36*s.* in summer and 33*s.* in winter. They have agreed to accept 34*s.* in summer and 31*s.* in winter,—the number of hours to remain as before.

Edinburgh.—On the 29th ult., at a meeting of the Master Painters' Association, it was resolved to dismiss the proposal, made by the men on strike, that a conference should be held with the view of settling the dispute. The masters have, it is stated, arranged for the employment of men from London and elsewhere in place of those now on strike.——On the 26th ult., the plasterers in the employment of Messrs. Stuart & Co., selenitic cement plasterers and artificial stone manufacturers, Thomas-street, Edinburgh, gave in their warnings. On the previous day, it appears, a representative of the Edinburgh Operative Plasterers' Association called upon the firm, and stated that they had violated one of the regulations of the Association, which provided that no master-plasterer should take on more than one apprentice each year. Messrs. Stuart & Co. replied that the Society's representative laboured under a misapprehension, and that the two boys in question were not plasterers' apprentices, the one being a message-lad and the other an artificial stone worker. A written statement to this effect was, we are told, communicated to the secretary of the Association, but no reply was received, and the next that was heard of the matter by Messrs. Stuart & Co. was the threatened strike of their plasterers.

Chorley.—After a strike lasting a month, the carpenters and joiners of Chorley have resumed work. The men have been, previously to the strike, receiving 8d. per hour, and they asked for an advance of 1d., but the masters offered them ½d. for twelve months. The men refused this offer, but have now accepted it. They are not to ask for an advance until the twelve months expire, and then they will have to give six months' notice.

Fleetwood.—The joiners on strike at Fleetwood, having failed to get the increased wages they demanded, have tried to exact from the masters a promise that all non-society men who shall not join the trade-union within a month shall be discharged. The masters refused to agree to any such thing.

THE PROPOSED NEW COUNCIL CHAMBER, GUILDHALL.

THE Court of Common Council at their last meeting resumed the debate* on the report of the Coal and Corn and Finance Committee, on the reference of the 28th of January, 1875, to consider the means of carrying into effect the report for the construction of a new Council Chamber, and the re-arrangement and reconstruction of the committee-rooms and offices on the north side of Guildhall. The motion before the Court, moved by Mr. John Pound, was,—"To agree with the committee in their report," but when the subject was last discussed the following amendment was moved by Sir F. Truscott:—

"That the recommendation contained in the report relative to the continuance of the coal duties be agreed to, and that it be referred back to the committee to consider the whole subject, and to report thereon. That the City Lands Committee be instructed forthwith to advertise for tenders for the erection of the Council Chamber and offices, according to the plans approved by this Court, and that it be referred to the Coal and Corn and Finance Committee to provide the necessary amount out of any funds, or by any means they may consider most advisable."

After discussion, the Court divided, and the tellers announced the numbers as follows:—For the amendment, sixty-seven; against, fifty-one; majority in favour of the amendment, sixteen.

Mr. G. Shaw asked if this division bound the Court to the site, as well as to the plans.

The Town Clerk replied in the affirmative.

Some discussion then took place as to whether the original plan for the erection of a new Council Chamber should be carried out in its integrity, it being urged by some members that the new Chamber should be continued within the precincts of the old historic spot at Guildhall, which its predecessors had occupied for ages. In the end however, Sir Francis Truscott's amendment was put and carried as a substantive motion.

* See p. 540, *ante*.

THE NEW BUILDINGS IN NORTHUMBERLAND AVENUE.

A LARGE number of workmen have been employed during the last few weeks in the excavations going forward on that portion of the site of Northumberland House situated between Northumberland-street and the Avenue, with its main frontage to Charing Cross, on which an extensive block of palatial buildings is about to be erected. The excavations are being carried to a depth of 20 ft. below the street line, considerably lower than the double basement vaults and cellars under Northumberland House, an enormous quantity of brickwork having been removed in the course of the excavations, which will amount to several thousand cubic yards. Trenches, 8 ft. in width, and about 9 ft. below the intended floor level of the basement of the buildings, are being made for concrete. The excavations and foundations for the structure are being carried out by Mr. E. Reddin.

CRITICAL RESTORATION.

SIR,—While Mr. J. J. Stevenson so grossly perverts facts as he has in his late paper read before the Institute, he cannot surely expect his dicta to be received with much respect; a person who so entirely misrepresents matters,—on points, too, in which the most superficial examination would have shown the real state of the case,—must not feel surprised if his hearers regard him as one of those who, whatever may be the fearlessness or earnestness of their language, are fighting not for the *truth*, but for the *mastery* of their own ideas and predilections.

It is very gratifying to find that Mr. Stevenson has been kindly taken in hand both by Mr. Hope and Sir Gilbert Scott; but, as regards the former, I rather fancy Mr. Stevenson may be tempted to cry, "*Et tu, Brute?*" for, unless I am very much mistaken, Mr. Hope's "English Cathedrals of the Nineteenth Century" has had not a little to do with the particular line of thought exhibited in the paper in question. In that book Mr. Hope has a fling both at the north-west tower and eastern screen of Canterbury Cathedral, although, so far as I remember, the throne itself was at that time kindly spared.

I most heartily agree with Mr. Hope that it is exceedingly wrong and unfair to mix up what was done forty-five years ago with the present phase of restoration or alteration at Canterbury, but must confess that it is news to me that the pulling down of the tower was received with "indignation." I myself have been in and about the cathedral,—non-officially,—from boyhood; I have at different times performed *con amore* every office in the building that a layman could do,—from helping the vergers with the seats and stools to accompanying "Boyce in C,"—and although the alleged deformation took place twelve years before I was born, I certainly think, had there been any outcry at the time, traditions of it must have reached down to date.

But I cannot see that Mr. Hope, in condemning the alteration of the tower, is any more consistent than the Mr. Stevenson he blames for the want of that very consistency; if it be permissible to insert Perpendicular tracery into Norman (or Romanesque, as Mr. Hope prefers calling it) windows for the purpose of breaking up and bringing them into proportion, it certainly must be lawful to remodel one of two towers of a western façade for the purpose of bringing them into harmony with each other.

The blunder into which Mr. Stevenson has fallen is visible enough: he is regarding our old buildings from one point of view only; it is solely in their historical, or, so to speak, *documentary* character, that he is considering the cathedrals of this and other countries,—a most important and excellent function truly, but certainly not their only one, nor even (by any means) the greatest. Mr. Stevenson forgets that, for at all events the last five or six hundred years, we have had abundant means, pictorial and otherwise, of recording the various changes through which any building whatever might, from various causes, be made to pass: thus, as in the case in point, the existence of Lanfranc's Tower, and consequent boundary of the Norman nave at this point, is a fact as well known to the Canterbury archæological student as the existence of the very nave itself; and the exact design,

height, &c., of the Norman erection may be easily studied through the numerous plates still in actual circulation.

With such examples before us as Vienna, Strasburg, Antwerp, Chartres, Notre Dame de l'Epine,—to say nothing of glorious Amiens,—I do truly marvel that any one should still be found to defend the barbarism of unmatched west towers. If Mr. Stevenson really and truly considers that the evidence afforded by the retention of the earlier tower as to the original length of the Norman nave more than counterbalanced the effect of the one-sidedness of the façade, then all I have to say is that it is a matter for sincere congratulation that he has not hitherto, as Sir Gilbert said, "tried his hand at restoration."

Perhaps, as the discussion has been raised, a few details as to the particular features in question may not be unwelcome.

With regard to the present north-west tower, Mr. Hope remarks, in the work already adverted to, that it is a tamer copy of a tame production. Mr. Stevenson says the earlier (companion) tower has been scraped and altered to look like the new one. Both are wrong; the tower could not be a "copy," and at the same time "tamer" (as regards design) than the original; nor could it be "tamer" without ceasing to be a "copy"; here is Homer nodding with a vengeance. Mr. Stevenson's assertion is simply ridiculous. The plain truth is this. At the time the authorities deemed it advisable to complete the design of the Perpendicular portion of the cathedral the (then) later or Oxford tower afforded a perfect guide except at three comparatively unimportant points, viz., the terminal rods of the top pinnacles, the proper completion of the lowest pinnacles, and the treatment of the central portion of the groined ceiling of the tower-spring itself. As regards the first, Mr. Austin simply fixed the length by judgment, and the dimension he adopted has been adhered to in the recent restoration of the Oxford tower. With reference to the second point, the corresponding pinnacles of the Perpendicular erection were weathered away to mere stumps. Mr. Austin was left consequently to his own unaided imagination, and, as is not unusual in such cases, imagination took a rather high flight and produced half a dozen or so of very ambitious spirelets, indeed, profusely crocketed. With respect to the third point, the Oxford tower could obviously afford no exact guide, for this being the steeple containing the bells, a circular opening had of course been left at the crown of the groining for their passage. In the new tower it was not contemplated to hang a single bell; there was, therefore, no necessity for an opening, and if there had been, the architect could hardly have gained anything from the existing example, as the lid that covers the orifice is of a flat and impure Late Elizabethan, or something of that sort. Imagination, therefore, once more took the matter in hand, and the result was a groined pendant of very elaborate conception. In the late restoration of the Oxford steeple, the lower pinnacles have been restored faithfully from fragments recovered, and are of much smaller size than in Mr. Austin's tower.

Thus, as regards Mr. Hope's assertion, it will be seen that where the "copy" was departed from, it was in the direction of licence the very opposite of tameness, and designed to remedy that very defect; and with reference to Mr. Stevenson's statement, it will be noted that the restorers have deliberately and intentionally departed from the design of Mr. Austin's tower, so far as regards a very important feature. It may be added that the Oxford tower has not been "scraped," but "cased," and that its stone is of an entirely different hue from that used in the northern tower.

When Mr. Hope regrets that Mr. Stevenson was not better informed as to the actual subject of his criticism, he deserves we should repress our commiseration that he in his turn was apparently unable to make a careful examination of Canterbury Minster before committing to the press his "English Cathedrals of the Nineteenth Century."

With regard to the stalls, I certainly think they have been overpraised; the whole effect must suffer through the bases of the little columns being hidden, giving the latter a very stick-like appearance; and as they are of fairly archaic Corinthian, the attenuated effect of the shafts is the more aggravating. However, be that as it may, it does not follow that, if removed, they will be "lost to sight" any more than necessarily and inevitably "to memory dear." I would suggest that they be placed inside the chapter-house, so as to furnish an entrance-lobby or passage: this their form would just suit, and, being clear of the walls, nothing of the Gothic work would be hidden; they would be about (say) 6 ft. from the west wall of the chapter-house, and if conjoined at the middle, leave the requisite space round the ends, so as to pass that way into the room; or, if preferred, the ends might return. On "speech days" this would be a great convenience for keeping out the draught of the cloisters, the stalls forming suitable seats for the clergy, &c., presiding over the exhibition.

With reference to the east screen, which Mr. Hope calls "confectionary," I do not know why he should use such an expression as indicative of apparently the *summum bonum* of contempt, like Lord Chesterfield's wish with reference to the animal that attacked his august calves. The erection is certainly faulty in detail, and of a type very different from that we are accustomed to regard as correct; but, as regards the former, if we except the transoms, it requires very close inspection to discover the inaccuracies; and as respects the latter, it seems incredible that a person of Mr. Hope's experience and research should not see that a screen of the close conventional type would here, owing to the elevated position of the east portion of the choir, simply ruin that end of the building. The general design of the screen embraces a very enriched cornice or detached string of foliage, from which, in continuation of the series of slender supporting mullions, pinnacles rise at intervals. The elevation is broken by a series of graded transoms, also of delicate proportions, rising to the highest in the middle, in order to follow the curves of the cornice; the openings or panels thus formed are glazed. I cannot speak with the authority of a professional architect, but it seems to me a work of undoubted, and, indeed, very high genius. As to its intrinsic gracefulness, and the effect it imparts to the extreme east end of the cathedral, there can, I should imagine, be but one opinion.

The throne is, I believe, by the same hand; it is either octagonal or hexagonal on plan (I forget which), and has a very elaborate and most elegantly fancied canopy, surmounted by a spire formed of four moulded and crocketed segments of a large circle, so placed that their tops are conjoined, the termination of course being the usual finial. Its cuspings,—of long pear-shaped form,—have been found some fault with, and its hanging corbels (from which the front portion of the canopy vault springs) are of course a structural impossibility, but with Henry VII.'s Chapel before us, I think we need not be too clever on this point. Neither it nor the screen displaced, so far as I am aware, anything earlier than sixteenth century work.

In conclusion, allow me to say that I yield to no man in the recognition of the importance of thorough professional and technical study and supervision, and right thankful are we that the cathedral is now safe in the hands of those whose intimate knowledge of the archaisms of Gothic is sufficient guarantee for the future treatment of the fabric; but let us not throw stones at those who at a time of darkness and difficulty laboured their best to produce designs they considered in harmony with the old forms. Sir Gilbert himself has not, so far as I know, given public utterance to any adverse criticisms with reference to Canterbury, and till he does I think the secondary and tertiary lights of the architectural firmament might well restrain themselves.

As to Sir Gilbert's *catholicity* of feeling, I think his printed utterances with reference to Sta. Sophia's may be held conclusive on that point; for an architect who has become, as it were, identified with English Gothic, to acknowledge a *chef d'œuvre* of Byzantine as the world's masterpiece, conveys to us, in my opinion, a lesson of self-abnegation as elevated as it is instructing and, unfortunately, rare.

JOHN W. WARMAN.

Indian Ink.—The *Papier Zeitung* gives the following receipt for making a deep black Indian ink which will also give neutral tints in its half shades:—Rub thoroughly together eight parts of lampblack, sixty-four parts of water, and four parts of finely-pulverised indigo. Boil the mixture until most of the water has evaporated, then add five parts of gum arabic, two parts of glue, and one part of extract of chicory. Boil the mixture again, till it has thickened to a paste; then shape it in wooden moulds, which have been rubbed with olive or almond oil.

THE FACTORIES AND WORKSHOPS BILL.

MR. CROSS's new Factory Bill repeals sixteen Acts of various dates, from the 42nd of George III. to the Factory Act of 1874, and consolidates the law relating to factories and workshops, introducing also certain amendments. Part I. sets forth the general law, and consists of thirty clauses, relating to the sanitary condition of factories and workshops, safety of workers therein, hours of employment of children and young persons in factories, and of children and young persons in workshops, holidays, education, certificates of fitness for employment, and investigation into accidents. Part II. comprises thirty-one clauses, containing special provisions relating to various matters—health and cleanliness, with special mention of bakehouses, special restrictions as to employment of young persons and children in certain specified kinds of work, special relaxations of the general law in certain factories and workshops as regards hours of work and night work, exemption from certain provisions of the Bill (such as those for allowance of holidays) where the workshop is a dwelling-house in which the family only of the occupier carry on the handicraft. The clause providing that a child, young person, or woman shall not be employed on Sunday in a factory or workshop is not to apply to Jews employing Jews, and keeping Saturday as Sunday. People are "children" while under fourteen, and "young persons" from fourteen to eighteen years of age. Part III. of the Bill provides for the administration of the law by inspectors, certifying surgeons, and penalties. Part IV. contains definitions, and one or two special exceptions, and makes special provisions in regard to the application of the Bill to Scotland and Ireland, one being that during the first year under this Bill (1878) it shall apply to children under nine years old as if they were ten (the minimum age for employment fixed in the Bill), and that children under nine lawfully employed before the commencement of this Act (on the 1st of January, 1878) may continue employed. The Bill has several schedules. A "factory" is a place in which any manufacturing process is carried on with the aid of steam, water, or other mechanical power; "workshop" means any other place in which any handicraft is carried on by any persons, and to which and over which the employer of such persons has the right of access and control.

THE ARTISANS, LABOURERS, AND GENERAL DWELLINGS COMPANY.

ON Saturday last an extraordinary general meeting of the shareholders of this company was held at the Westminster Palace Hotel, in compliance with the requisition of which mention was made in the *Builder* three weeks ago (page 502).

The Chairman (Dr. Baxter Langley) urged shareholders not to go into allegations which had been published, and to reserve whatever they wished to say, because as a committee of investigation was to be proposed, that would be the proper tribunal at which such questions could be dealt with. The requisitionists had called the meeting for the purpose of considering a motion for the appointment of a committee of investigation, and he would say that the directors had no objection to the proposition. Indeed, they courted inquiry of the strictest character, and when the committee was appointed the Board proposed to place in their hands the resignation of the directors, so that if the committee's report should be adverse to them they would, of course, retire, and others would take their place. There was only one stipulation they would make, and that was that the committee should not be formed of those gentlemen who had shown hostility to the present Board. He moved that a committee should be appointed to inquire into the financial position of the company, the purchase of the estates, the cost and quantities of material used in building, the condition and prospects of each of the company's estates, and such other business relating to the general business of the company as they may deem necessary.

Mr. Ashley, M.P., said he was glad to find that the Board were agreeable to the motion of the requisitionists. The company was an excellent one, and one calculated to do a deal of good, and if anything was found to be wrong—he did not say there was—it would be very disastrous. The course the requisitionists had pursued in calling the meeting together, was only taken after all

other means had been exhausted. The arbitrators had prepared a report, and would have sent it to the shareholders, but for an intimation from the Board that if they did so it would be at their peril. They then asked the Board to send it out, but that had never been done. Through Mr. Pearce's pamphlet an investigation had taken place, but the result had never been made known to the shareholders, and therefore they had called this meeting. He seconded the resolution.

It was afterwards resolved that the following gentlemen should be asked to form the committee:—Mr. Samuel Morley, M.P.; Mr. W. H. Stone, ex-M.P. for Portsmouth; Mr. C. M. Palmer, M.P.; Mr. E. Noel, M.P.; Mr. F. D. Mocatta, Mr. J. Kempster, Mr. H. R. Droope, the Hon. E. A. Ashley, the Revs. A. M. Preston, H. G. Cutler, and J. M'Dougal, and Messrs. J. Dunnington, J. M. Bell, J. Buckell, S. Cozens, and H. Buckell, power being given them to employ professional assistance.

CHANCEL SCREENS: IMPORTANT JUDGMENT.

DR. TRISTRAM, chancellor of the diocese of London, has delivered judgment in the Consistory Court upon the petition of the vicar and churchwardens of St. Augustine's, Haggerstone, to issue a faculty authorising the erection between the chancel and the nave of a dwarf wall, with entrance-gates.

He said it had been the practice to refuse to issue faculties authorising the erection of gates to chancel-screens or of chancel-screens making an unusual and marked separation between the chancel and nave. In the present case the Court was asked to depart from that rule. The argument in favour of the gates was shortly this, that before the Reformation chancel-screens were a necessary adjunct to a parish church, being generally surmounted with a crucifix, called "the rood"; that gates were the proper appendages to chancel-screens; that though the rood was directed to be removed and the rood-loft altered, yet the then-existing screens were allowed to remain, and the Rubric required a screen of some sort or other in all our churches. That construction of the Rubric was not in accordance with contemporaneous or continuous usage; and it had never been deemed imperative, in the faculties issued since the date of the Rubric, to require the chancel to be so separated from the nave. The significancy of the screens in question could only be construed to be for the purpose of exclusion, and to show that the chancel was of a sacred character, distinguishable from that of the rest of the church. The introduction of gates with such a significancy might cause offence and be indicative of making the parish church the church of a party. In all the circumstances he saw no good reason for departing from the general rule established by Dr. Lushington, and he therefore rejected that part of the prayer of the petition which asked the Court to sanction the erection of gates attached to the wall. The faculty might go for the other alterations desired.

The Commissary-General has also delivered judgment on the petition of the Rev. Henry Lloyd Russell, vicar of the church of the Annunciation, Chislehurst, for a faculty authorising certain alterations or decorations in the chancel of the church, including the erection of a chancel screen of considerable height, with entrance-gates and a large cross.

He said the plans had been submitted to the archbishop for his approval, but his grace had declined to endorse them. As the vicar now said that he was content that the faculty should go without the gates and the cross, and as the screen was an open one and did not in any way impede the view, and having been informed by the registrar that the archbishop would not object to the plan as altered, the faculty might go for all the matters prayed, except the gates and cross.

BYRON MEMORIAL COMPETITION.

BY mere accident we learnt, at the moment of going to press, that the models for the Byron Memorial, sent in competition, were open to the public in the west crush-room of the Albert Hall. The fact that we were allowed to find this out for ourselves seems to us to explain why such ill-success has attended the endeavour to obtain good designs. The whole affair has been bungled by incompetent hands.

Thirty-nine designs are exhibited, mostly bad,—many of them, indeed, are simply awful.

The committee have selected for the first place No. 6 in the catalogue. In this, Byron is seated upon a rugged rock by the sea-shore. The head, inclined gently towards the right, is in pensive attitude, with the chin resting in the hollow of the right hand; on the left knee lies the open MS. book of "Childe Harold," in which the poet is presumed to have just inscribed the famous stanza, "To sit on rocks, to muse o'er flood and fell." His only companion is his favourite Newfoundland dog "Boatswain," who, crouching at his feet, looks up in his face with a truthful expression of canine fondness and fidelity. The pose of the poet's form is easy, and the countenance is spirited and thoughtful. The pedestal is very large, and not very successful. Mr. Richard Belt is given as the name of the designer.

The model placed second in merit by the committee is No. 13 in the catalogue, and involves much more design. The notion embodied is that Byron, as the Greek patriot, of whom a very characteristic figure is given, is watched over by Minerva, whose shield forms a nimbus to his head, and whose bust crowns a *Stele* behind him; and there are two side figures representing Poetry and Chivalry.

We are also able to add that the authors of this design are Mr. Mullins, sculptor, and Mr. H. H. Statham, architect.

FALL OF A BRIDGE AND LOSS OF LIFE.

THE celebration of the centenary of the Bath and West of England Society has been marred by a dreadful accident, owing to the fall, on Wednesday morning, of the Widcombe Suspension Bridge, leading from the Great Western Station at Bath across to Widcombe, in the direction of the showyard. The bridge, which seems to have been blocked with people at one end, owing to inadequate arrangements for taking tolls, is described by the *Times* as having been constructed some fifteen years ago as a foot-bridge, from the designs of Messrs. Hicks & Isaacs. It was of wood and iron, was about 12 *ft.* in width, and, though it was popularly known as the Widcombe "Suspension" Bridge, was really supported by an arch of woodwork stretched from buttress to buttress, either end of which was secured to piers by tie-bolts. The flooring of the bridge was braced to the over-arching woodwork by suspension-rods, the whole structure being thus of a light description; and though the massive beams of wood forming the girders of the flooring gave it an appearance of considerable strength, it was never intended to carry an enormous weight such as that to which it was now subjected. The span was about 180 ft. and the face of the buttress on a level with Chiverton-street was about 40 ft. above the bed of the river, the water in which was about 10ft. deep. It is computed that about 200 persons were on the bridge just before the time of its fracture. About fifty of them had passed the toll-keeper, when the flooring of the bridge was seen to be bending in the middle beneath the superincumbent weight, and in one moment a crash was heard, the ends of the tie-rods and girders resting on the south buttress were seen to separate from the masonry, and the holiday crowd previously standing on the bridge were suddenly shot, as it were, down two inclined planes into the very centre of the river. Several persons were killed, among them being Mr. John Thorne, surveyor, of Charminster. Some forty or fifty persons were seriously injured, and are inpatients of the Bath United Hospital. Who is to blame for the overloading of so comparatively fragile a structure?

NEW PARKS.

Paisley.—On the 26th ult. a new public park,—a gift to the town by a deceased citizen, Mr. Robert Brodie, accountant,—was opened with much ceremony. The park is situated at High Carriage-hill, in the southern part of the town, and extends to about twenty-two acres. Its value is estimated at 16,000*l.*, and during the past year or two the Town Council have expended about 2,800*l.* in laying it out and ornamenting it.

Gateshead.—Since the grounds of Mr. William Wailes, at Saltwell, were purchased by the Gateshead Corporation and converted into a park for the use of the inhabitants, who, at that time, had little or no place approaching to a recreation-ground, great improvements have been made by way of further beautifying the estate. For some time past the Park Committee have been pushing on the work of improvement with rapidity. One of the chief features will be the long promenade, which is at present under formation at the north end of the park. On either side of the promenade the ground has been laid out under the direction of Mr. Heath, of London, landscape gardener.

A Big Stone.—A stone of large dimensions has just been got from the quarry of Messrs. Charnock & Sons, Southowram, for Messrs. John Jennings & Son, stone merchants. The size of it was 15 ft. 10 in. by 10 ft. 4 in., in all 163½ superficial feet, and the weight seven tons.

DRYING PROCESS.

SIR,—I have only just had opportunity of seeing Mr. Lascelles about the visit of the Architectural Association to his works, as reported in your paper (p. 295, *ante*), and so have been unable until now to communicate to you my objection to part of the report respecting our drying process. It states, "The temperature is allowed to rise to from 130° to 150°, never exceeding the latter." This places the matter in a different light from what we like to have it, and from what it really is. The temperature in this process must rise to 150° Fahr., at the very least, and we do not recommend a trial of it at a lower temperature, and for the more effectual working, *i. e.* a greater saving in time, &c., the temperature should rise to 170°,—160° to 170°.

S. G. DENNIS.

Books Received.

Street Life in London. By J. THOMSON, F.R.G.S. and ADOLPHE SMITH. Sampson Low & Co., Fleet-street.

ONE-HALF of the world does not know how the other half live. Those who, admitting this fact, think it ought to be otherwise will welcome "Street Life in London," now publishing in monthly parts. Each part contains three permanent photographic illustrations, taken from life expressly for the publication, with letterpress mostly by Mr. Adolphe Smith. Part V., for example, just now issued, consists of the "Dramatic Shoeblack"; "Tickets," the Card-dealer; and the "Old Clothes of St. Giles." Some of the articles, treating of individual persons, become biographies of the humble, and open to view fresh phases of life. The photographs would be better if the faces were kept lighter. The work when completed will make an instructive as well as entertaining volume.

Miscellanea.

The Artisans' Institute. — The annual meeting of this Institute was held on the 2nd inst., the Earl of Roseberry in the chair. The report, read by the principal, the Rev. Henry Solly, states that, "Although the number of members is not so large as at first, when the Institute was supposed to be more of a club than for educational purposes, yet, as the object is to have real students, and not merely members who join without belonging to classes, we may certainly be congratulated on, and be encouraged by, our increased success. Taking the total number of students last session at 100, we find an increase in our present numbers of ninety-three, the total number, including those of the Bricklayers' Class, now being 193. Of these, several attend more than one class, so that the number actually enrolled in the class register books exceeds 278.

A Projected Rival to the Royal Academy. A London letter to a provincial journal says that a number of artists of position met a few weeks ago to discuss the practicability of organising an exhibition of paintings and sculpture in London, on a large scale, following the general plan of the Royal Academy, but adopting various alterations in detail. The number of good works sent in to the Royal Academy is so largely in excess of the available space in the saloons of that institution that every year a good deal of disappointment and discouragement is given to all ranks of artists outside the potent Corporation itself. The contemplated association is to be called the "National Society of Artists," and one of the most noteworthy conditions will be that when the number of members reaches a certain maximum, a stated proportion shall retire annually, so as to cause a constant infusion of new blood.

Jewish Almshouses for Liverpool.—New almshouses for Jewish ladies have been consecrated in Liverpool. They are situate in North Hill-street, Toxteth Park, and have been erected at the cost of the late Miss Eliza Jackson. The houses are intended for the reception of reduced ladies of the Jewish faith. The building has been constructed in the Elizabethan style. It is understood that six ladies will reside in the houses, and for each a large living-room, bedroom, and kitchen are provided, and there is a very pretty garden in front of the main building. The space occupied by the institution covers an area of about 1,000 square yards. The land and building have cost 3,500*l.*, and Mrs. Braham has invested 7,000*l.* in Consols so as to provide a sum of 200*l.* per year for the maintenance of the inmates. The architects are Messrs. Hoult & Wise, of Liverpool, and the builder is Mr. J. H. M'Gaul.

Doings at Montreal.—A letter from Canada in the *Gloucestershire Chronicle* says:—"At Montreal the signs of progress and improvement are evident on every hand. The new City Hall is in every respect the grandest and most imposing structure in Canada, with the single exception of the Parliament Buildings at Ottawa. The Windsor Hotel, now approaching completion at a total cost of $750,000, is a gigantic caravanserai on the American plan. It is six or seven stories high, faced with cut stone on the two principal fronts, and will probably prove about as profitable an investment as the Great Eastern or the Grand Trunk. But the most remarkable, though not the largest, building in Montreal is undoubtedly the new Cathedral of St. Peter, an exact model, it is said (of course on a reduced scale), of St. Peter's at Rome. The walls are now about 50 ft. high, but for the present the work is at a standstill. The custom among Roman Catholics here in building a new church is to do the work on cash principles. As long as the cash comes in the work goes on; when one stops the other stops also. The Protestant system, on the other hand, is to run up the building as if working for a wager, and then mortgage it to the last brick to pay the contractor. The main peculiarity developed by St. Peter's, so far, is the absence of windows, giving it rather a barn-like appearance."

Institution of Mechanical Engineers.—The annual general meeting of this society was held, on the 31st ult., in the hall of the Institution of Civil Engineers, Great George-street, Mr. Thomas Hawksley, the president, in the chair. The president announced that, subject to satisfactory arrangement being made in the locality, the next meeting of the Institution would be held in Bristol, from July 24th to July 27th inclusive. The reason for the change in the date was because that formerly appointed clashed with the assizes, and there would not be sufficient hotel accommodation in the town. He had also to state that a committee of the council had been appointed for the purpose of arranging terms for obtaining possession of premises in Westminster, deemed by the committee to be suitable for the Institution. The business of the session was then commenced by the renewed discussion on "Homogeneous Iron, and the Degree of Homogeneity to be effected in Iron produced by various Systems of Puddling and subsequent Working," by Mr. Henry Kirk, of Workington, the author of the paper, which was continued by Mr. Siemens, Dr. Bell, and other gentlemen.

Paper Houses.—A manufacturing company in Wisconsin, according to the *New York Mail*, keeps three mills constantly running on building paper, having capacity for the making of sixteen tons per day. As long ago as 1857 the company began the manufacture of paper for building-purposes. The paper is a thick, hard pasteboard, wound in rolls of 25 lb. to 100 lb. each, and usually 52 in. wide. While in process of manufacture it is subject to a pressure of hundreds of tons, which compresses the fibres together in one solid body, thus making an absolutely air-tight sheet; and as paper is one of the best non-conductors known, it resists the action of both heat and cold, and so a building lined with it is made warm in winter and cool in summer. It does not shrink like lumber, and is not affected by frost, cold, heat, or dampness; and it is known that it will not burn as readily as wood, on account of its hardness and solidity, and by its use a house can be almost, if not absolutely, tight."

The Opera House on the Embankment.—At the meeting of the Metropolitan Board of Works on the 1st inst., the Works and General Purposes Committee submitted a report as to an application by Mr. Mapleson for an extension of time until Lady-day next for the roofing-in of the new Opera House on the Victoria Embankment, and a further extension of six months from that day for its entire completion, and recommending that the application be granted, subject to an agreement prepared by the solicitor of the Board, and submitted with the report of the committee for approval and sealing by the Board. Mr. Roche said the agreement well protected the interests of the Board, and simply extended the time for roofing-in and completing the building, all rent having been paid up to the present time. The recommendation was agreed to.

Newgate.—The *City Press* is assured that the rumours as to the removal of Newgate are not correct.

Chinese Washermen.—It is stated that an experiment is shortly to be made in introducing "Chinese domestic labour" into England. Shiploads of Chinese labourers are about to be imported by a London firm of shippers. They will be sent over by a Hong Kong house. John Chinaman offers his services as cook, houseman, and washerman; and, if accounts be true, he is in those capacities invaluable. As a laundryman he is said to be unapproachable, and an opportunity for displaying his talents in that direction is shortly to be given by the erection of a Chinese laundry in Holland Park. The building, it is said, has already been begun.

The Marezza Marble Company.—The Patent Marezza Marble Company, whose works in Shenton-street, Old Kent-road, have been carried on during the last three or four years, have at length been brought to a stand, and the company is now in liquidation owing to want of adequate support. By order of the liquidators the patent rights of the company, together with the whole of the manufacturing plant, were offered for sale on the premises on Tuesday; but although several offers were made, we understand that no actual sale was effected, and that the l ase of the premises also failed to command a purchaser.

A Chester Cocoa-house.—In order to obtain the accommodation required for the Nag's Head Cocoa-house, the premises are now undergoing considerable alteration. On the ground-floor will be a restaurant, 33 ft. long and 17 ft. wide, with a public entrance from Foregate-street. The front of the building will be entirely new, and substantially constructed with English oak framing and brick filling, in the style characteristic of the old houses of Chester. Messrs. Farrimond & Co. are the contractors for the work, which is being executed from the designs and under the direction of Mr. John Douglas, architect.

Rendle's Patent System of Glazing.—The spread of this system appears fully to justify the good opinion of it we have expressed. The roof of the proposed great railway station for the Caledonian Railway Company, in Gordon-street, Glasgow, which will have 130,000 square feet of glass, is to be executed according to "Rendle's Patent System," on the ground that it admits of a very liberal amount of ventilation, while it prevents all ingress of rain.

TENDERS.

For completing the tower of St. Mark's Church, West Hackney. Mr. E. L. Blackburne, architect:—

Stamp & Bowtle	£4,376 0 0
Cook	3,746 0 0
Sargeant	3,485 0 0
High & Co.	3,270 0 0
Forrest (in error)	2,296 0 0

For the erection of new Trinity Church, Gunnersbury, Middlesex, for the Rev. W. Frith. Messrs. R. Tomlinson & Byrne, architects. Quantities supplied by the architects:—

Gibson Bros.	£3,480 0 0
Admonson & Sons	2,991 0 0
Nye	2,970 0 0
Carless	2,890 0 0
Eaden	2,800 0 0
Edymon	2,725 0 0
Brunsden	2,640 0 0
Barnes (too late)	2,600 0 0

For Friends' schools, at Saffron Walden, Essex. Mr. Edward Burgess, architect:—

Brown	£19,220 0 0
Bayes, Bros., & Allen	18,186 0 0
Whiffen & Sons	18,150 0 0
Dove Bros.	17,672 0 0
Browne & Robinson	17,621 0 0
Kirk & Randell	17,479 0 0
Hill, Higgs, & Hill	17,440 0 0
Brass	17,397 0 0
Jerrard	17,383 0 0
Bell & Sons	16,545 0 0

For houses in St. Paul's-road, Birmingham, for Mr. Webb. Messrs. T. C. & J. P. Sharp, architects:—

Mountford	£1,593 0 0
Charley	1,590 0 0
Mills & Son	1,564 0 0
Dowse	1,548 0 0
Bowen (accepted)	1,545 0 0

For houses in Oxford-road, Moseley, Birmingham, for Mr. Potter. Messrs. T. C. & J. P. Sharp, architects:—

Mountford	£1,333 10 0
Hancox	1,322 0 0
Mills & Son	1,320 0 0
Bowen	1,305 0 0
Simons	1,277 0 0
Corbett	1,275 0 0
Loud	1,268 0 0
Dowse (accepted)	1,244 0 0

For the erection of two porters' houses, for Messrs. Huntley & Palmer, Reading. Messrs. Wm. & J. T. Brown & F. W. Albury, architects:—

Filewood	£1,245 10 0

For the erection of new shop, &c., Reading, for Mr. Wm. McIlroy. Messrs. Wm. & J. T. Brown & F. W. Albury, architects:—

Talbot	£980 0 0

For the erection of new warehouses and stabling, Reading, for Mr. James Holmes. Messrs. Wm. & J. T. Brown & F. W. Albury, architects:—

Searle	£1,360 0 0

For houses in Oxford-road, Moseley, Birmingham, for Mr. Fowler. Messrs. T. C. & J. P. Sharp, architects:—

Simmins	£2,950 0 0
Corbett	2,905 0 0
Mills & Son	2,868 0 0
Bowen	2,843 0 0
Hartley	2,797 0 0
Hancox	2,718 0 0
Mountford (accepted)	2,660 0 0

For a block of eight cottages, for the Bromley Cottage Improvement Company, Limited. Mr. George Truefitt, architect:—

Carter	£1,430 0 0
Payne & Balding	1,269 0 0
Copping (accepted)	1,200 0 0

For erecting a house on the Hendon Estate, Hampstead, for Mr. W. Ambrose. Mr. George Truefitt, architect:—

		Extra for red facings.
Scrivener & White	£4,049 0 0	£40 0 0
Patrick & Son	3,9.8 0 0	34 0 0
Warne	3,800 0 0	20 0 0
Bird (accepted)	3,800 0 0	—

For alterations to the York and Albany, Regent's Park. Messrs. Bird & Walters, architects:—

Godden	£1,179 0 0
Newman & Mann	1,173 0 0
Hookly	1,135 0 0
Williams & Sons	1,120 0 0
Brown	1,079 0 0
Mark	997 0 0
Anley	940 0 0

For alterations at the Civet Cat, High-street, Kensington. Messrs. Bird & Walters, architects:—

Sykes	£543 0 0
Brown	490 0 0
Williams & Sons	430 0 0
Mark	422 0 0
Anley	390 0 0
Hookly	380 0 0

For alterations at the Lord Napier Tavern, Victoria Park, for Mr. Fredk. Day. Messrs. Ashby & Green, architects:—

Cole	£721 0 0
Charlton & Mansell	597 0 0
Smith	583 0 0
Lewis	570 0 0
Stamp & Bowtle (accepted)	475 0 0
Pewterers' Work.	
Warne (too late)	£56 0 0
Skinner (accepted)	36 15 0
Gasfitters' Work.	
Vaughan & Co.	£53 0 0
Winn	25 0 0
Dodson (accepted)	23 0 0
Plate Glass, Writing, and Embossing.	
Hollyer (accepted)	£165 14 4

For the Blundell-street Schools of the Kingston-upon-Hull School Board. Messrs. W. Botterill & Son, architects. Quantities supplied:—

Stamp	£7,517 0 0
Skinner	7,489 0 0
Sergeant	7,479 0 0
Barry	7,400 0 0
Smith	7,288 0 0
Jackson & Son	7,245 0 0
Musgrave, jun.	7,150 0 0
Grassby	7,080 0 0
Brown	7,039 0 0
Drury & Harper	7,023 0 0
Habbershaw & Son	6,967 16 9
Hockney & Liggins (accepted)	6,804 14 0

For pulling down and rebuilding house and shop, 179, Green-street, Bethnal-green. Messrs. T. & W. Stone, architects. Quantities not supplied:—

Hughes	£379 0 0
Thomerson	372 0 0
Howard	365 0 0
Moore	350 0 0
Souster	297 0 0

Accepted for the enlargement and alteration of the Shustoke Industrial School:—

C. J. & G. Fox	£2,498 17 6

For north boundary-wall, Manor-park Cemetery, Little Ilford:—

Richardson	£640 0 0
Williams	610 0 0
Page	605 0 0
Warr	570 0 0
Stamp & Bowtle	558 0 0
Jackson	542 0 0
Webb (accepted)	525 0 0

For pair of villa residences, Avenue-road, Forest-gate. Mr. W. Smith, architect. Quantities supplied:—

Dyer	£998 0 0
Page	975 0 0
Noble	975 0 0

For house, Sebert-road, Forest-gate, for Mr. Williams. Mr. Peters, architect. No quantities:—

Page	£495 0 0
Ullett	475 0 0
Hoskins	415 0 0

For house, Sebert-road, Forest-gate, for Mr. Shunter. Mr. Peters, architect:—

Page	£600 0 0
Ullett	570 0 0
Hoskins	465 0 0

For the erection of five cottages in Baynham-road Edmonton. Mr. T. J. Hill, architect:—

Coote & Sayer	£895 0 0
Wilkins (accepted)	850 0 0

For new billiard-room and repairs and alterations, No. 23, Palace-gardens, Kensington, for Mr. Philip Falk. Messrs. Salomons & Wornum, architects. Quantities by Mr. Bagg:—

	Billiard-room.	Repairs, &c.
Dove Bros.	£2,585 0 0	£3,000 0 0
Shepherd	2,105 0 0	1,568 0 0
Nightingale	2,100 0 0	1,460 0 0
Kinnimont	2,249 15 0	1,245 15 0
Macey	1,950 0 0	1,543 0 0

For new school-rooms and alterations to Abney Congregational Church, Stoke Newington. Mr. T. F. Fife, architect:—

		Allow for old materials.
Bayes, Bros. & Allen	£3,718 0 0	£44 10 0
Haysworth	2,693 0 0	30 0 0
Smith	2,673 0 0	—
Barber	2,521 0 0	112 0 0
Groom	2,520 0 0	100 0 0
Larter	2,480 0 0	130 0 0
Staines & Son	2,478 0 0	30 0 0
Linfield	2,026 0 0	90 0 0

For works in restoration to stonework, &c., to Bloomsbury Chapel, Bloomsbury-street. Messrs. George & Peto, architects. Quantities supplied by Messrs. Stoner & Sons:—

Simpson & Son	£3,652 0 0
Peto Bros.	3,231 0 0
Hill, Higgs, & Hill	3,200 0 0
Brass	1,650 0 0
Dove Bros.	1,500 0 0

For schools, Tooley-street, Southwark, for Rev. J. C. Bamber. Mr. H. J. Hansom, architect:—

Smith	£1,895 0 0
Lathey Bros.	1,834 0 0
Gregory	1,817 0 0
Stimson & Co.	1,782 0 0
Turtle & Appleton	1,765 0 0

For warehouse, Felix-street, Westminster Bridge-road, for Mr. J. Ward. Mr. John Groom, architect:—

Patrick	£3,797 0 0
Downs	3,765 0 0
Marshall	3,590 0 0
Nightingale	3,475 0 0
Scrivener & White	3,456 0 0
Thompson	3,340 0 0
Stimpson & Co.	3,300 0 0
Smith	3,158 0 0

For additions to dwelling-house, Wilford-road, Nottingham. Mr. T. G. Alderson, architect:—

Cordon	£357 0 0
Parnall Bros.	340 0 0
Mason	335 19 0
Chester	278 6 4
Flinders	273 10 0
Tyers	257 10 0

For roads and sewers on the Estate of Mr. David Mitchell, at Sandown, Isle of Wight. Mr. Francis Newman, surveyor:—

Sibley	£720 0 0
Coker	640 0 0
Coker, jun.	636 0 0
Meader	630 0 0
Hayden	620 0 0

For the erection of school in Bath-road, Swindon, for Mr. S. Snell. Mr. W. H. Read, architect:—

Phillips	£287 10 0
Barrett	208 16 0
Wiltshire (accepted)	205 0 0

For alterations at No. 35, Wood-street, Swindon, for Mr. J. Chandler. Mr. W. H. Read, architect:—

Wiltshire (accepted)	£397 0 0

For the erection of six almshouses in Cricklade-street, Swindon, for the Vicar and Churchwardens of the parish. Mr. W. H. Read, architect:—

Phillips	£919 16 0
Thomas	905 10 0
Wiltshire	899 0 0
Barrett*	891 17 0

* Accepted subject to reduction in plan.

For laying service mains in connexion with the new Water Works, Ripley, Derby, for the Local Board. Mr. R. Argile, jun., engineer. Quantities supplied:—

Beardsley	£1,509 7 6
Helling	1,151 2 1
Knight	1,126 16 8
Coupe	1,007 14 0
Stevenson	664 10 0
Fretwell	575 8 2
Wain	566 4 0

For the erection of new warehouses at the corner of Crown-street and Sutton-street, Oxford-street, for Messrs. Crosse & Blackwell. Mr. R. L. Roumieu, architect. Quantities supplied by Messrs. Welch & Atkinson:—

Warne & Sons	£16,966 0 0
Longmire & Burge	15,048 0 0
Pritchard	14,999 0 0
Smith & Co.	14,795 0 0
Dove Brothers	14,125 0 0
Macey & Sons	13,670 0 0

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T. B. (the existing law is doubtful; but we are disposed to think our correspondent has grounds for an action).—G. M. (the bow-window can be reinstated. Consult with the district surveyor previously).—Zero (must search for himself).—An Oddfellow (we cannot advise on private differences on *ex parte* statements. The sum named is greatly in excess under ordinary circumstances).—R. R.—C. T.—T. W.—G. T.—G. W.—Dr. P.—E. L. B.—C.—C. H.—T. S. W.—W. B. & Son.—J. W.—S. & J. S.—A. C.—S. J. J.—J. P.—G. M.—H. C. S.—E. A.—R. L. B.—G. & B.—H. P.—G. S. H.—H. H.—M. & S.—S. H.

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